

**REISSUED  
JUNE 1, 1992**

REVISED SHEET NO. 33  
Effective: October 31, 1966

RULE NO. 14

Service Connections and Facilities on Customer's Premises

A. METER INSTALLATIONS AND MISCELLANIOUS SERVICE EQUIPMENT ON  
CUSTOMER'S PREMISES

1. Meter Installations

- a. Location: All meters shall be installed at some convenient place approved by the Company, upon the customer's premises and shall be so placed as to be accessible at all times for inspection, reading and testing. The customer shall at his expense provide a new and approved location for all meters whenever necessary in order to comply with the foregoing.
- b. Multiple Occupancy Buildings: In all multiple occupancy buildings in which meters are required for the various customers in the buildings, the meters shall be installed at a centrally located point or points approved by the Company and shall be clearly marked by the building owner to indicate the location served by each meter.
- c. Sealing of Meter and Metering Equipment: All Company meters and related metering equipment will be sealed by the Company and no such seal shall be tampered with or broken except by an authorized representative of the Company.
- d. Where a customer requests service under two or more different rate schedules because of the purposes or uses to which the energy is applied, separate meters shall be installed to measure the energy supplied under each rate schedule.

2. Miscellaneous Service Equipment

- a. Equipment Furnished by the Customer: The applicant or customer shall furnish, install and maintain in accordance with the Company's requirements all conductors, service switches, fuses, meter sockets, meter and instrument transformer housing and mountings, switchboard meter test buses, meter panels and similar devices, irrespective of voltage, required for service connection and meter installations on the customer's premises. Detailed information will be furnished by the Company upon request. The customer or applicant should also comply with all applicable National, State and County electrical codes.
- b. Equipment Furnished by the Company: The Company will furnish the necessary instrument transformers, test facilities (except switchboard meter test buses) and meters. These items will be owned, operated and maintained by the Company.

B. SERVICE CONNECTIONS

No customer or any person other than a duly authorized employee of the Company may connect or disconnect the customer's conductors to or from the Company's conductors. Service connections will be made only under the conditions described in Subparagraphs 1, 2 and 3 below.

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RULE NO. 14 (Continued)

Service Connections and Facilities on Customer's Premises

1. Overhead Services Connections from Overhead Lines

- a. Service Drops: Upon receipt of an application from a bona fide applicant for service approved by the County Electrical Inspector the Company will at its expense furnish and install a single span of service conductors from its pole or other aerial support to the customer's first permanent support or point of delivery provided such support and connection is of a type approved by the Company and is so located that the span will comply with good engineering practice and applicable laws, ordinances, rules and regulations.
- b. Impaired Clearance: Whenever any of the clearances required by the applicable laws, ordinances, rules and regulations become impaired by reason of a change made upon a customer's premises, the customer shall at his expense provide a new and approved support in a location approved by the Company for termination of the Company's existing service drop and shall also provide all required service entrance conductors and equipment.
- c. Service Entrance Conductors: For each service connection, the customer shall furnish at his expense a set of service entrance conductors which shall extend from the termination of the Company's service drop at the customer's support to the meter. The service entrance conductors shall comply with applicable laws, ordinances, rules and regulations.

2. Underground Service from an Underground System

- a. Commercial Service: In areas where a distribution system has been installed underground in accordance with Rule 13, commercial service will be by underground connection only.

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RULE NO.14 (Continued)

Service Connections and Facilities on Customer's Premises

- 1) Secondary Service: The customer shall furnish without charge to the Company a suitable space and enclosure for the transformers and switching devices necessary to serve him. The customer shall furnish and install two primary ducts underground in concrete, necessary pullboxes from the property line to the transformer enclosure, and the secondary service connection conductors to the transformer space and shall contribute the estimated cost installed of the primary cables less the estimated cost of normal overhead facilities which would be required to serve an equivalent load.

The Company will furnish and install two sets of primary conductors and appurtenances to the transformer enclosure, will designate the location and specifications of the primary ducts and pullboxes, and will terminate the secondary cable installed by the customer at the transformer.

- 2) Primary Service: The customer will furnish and install two ducts underground and necessary pullboxes from the property line to the customer's pullbox or switchgear and will contribute the estimated cost installed of the primary conductors in these ducts. The Company will furnish and install two sets of primary conductors from the property line to the pullbox or switchgear, and will designate the location and specifications for the ducts and pullboxes.
  - b. Residential: Where the distribution system has been installed underground in accordance with Rule No. 13, service to a residential building occupied by a single family will be by underground connection only. The customer or applicant shall make a contribution of the estimated cost of an underground service less the estimated cost of normal overhead service which would be required to serve an equivalent load. The customer or applicant shall furnish when feasible, the trenching, backfill, ducts and pullboxes where necessary. The Company will furnish and install the service conductors to the customer's point of service connection and will designate the location and specifications of the ducts, pullboxes, trenching and backfilling. Where residential service is to be provided to any building which is not used solely as a residence by a single family, the Company may require the owner or owners to comply with Rule 14-B2a.
3. Underground Service Connection from an Overhead Source  
Where the customer desires underground service, the Company will furnish and install the underground Service conductors under the following conditions:
    - a. Commercial Service
      - 1) Where the secondary voltage is available on the overhead system at the customer's premises, the customer shall furnish and install the necessary ducts and pullboxes from the pole line to the customer's service connection and shall make a contribution of the estimated

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Service Connections and Facilities on Customer's Premises

cost installed of the service conductors on his premises. The Company will furnish and install the service conductors and will designate the location and specifications of the ducts and pullboxes.

- 2) When the Company's transformers are to be located on the customer's premises, the customer shall furnish a suitable space, foundation and enclosure for the transformers and switching devices, shall furnish and install the necessary primary ducts and pullboxes from the pole line to the transformer space and shall make a contribution of the estimated cost installed of the primary service conductors less estimated cost of the overhead facilities normally required for an equivalent load. The Company will furnish and install the primary service conductors and will designate the location and specifications of the primary ducts and pullboxes. Where maximum continuity of electrical service is required in the public interest, two sets of primary service conductors shall be installed.

b. Commercial Service—Primary Voltage

Where the service is at primary voltage, the customer shall furnish and install the required ducts from the pole line to the service termination point and shall make a contribution of the cost installed of the primary service conductors less the estimated cost of normal overhead facilities which would be required to serve an equivalent load. The Company will furnish and install the primary service conductors and will designate the location and specifications of the primary ducts. Where maximum continuity of electrical service is required in public interest, two sets of primary service conductors shall be installed.

c. Residential Service

In residential areas the customer or applicant shall make a contribution of the estimated cost of an underground service installed on his premises less the estimated cost of normal overhead facilities which would be required to serve an equivalent load. When feasible, the trenching, backfill and any necessary conduit and ducts will be furnished by the customer or applicant. The Company will furnish and install the service conductors to the customer's point of service connection and will designate the location and specifications of ducts, pullboxes, trenching, and backfilling. Where residential service is to be provided to any building which is not used solely as a residence by a single family, the Company may require the owner or owners to comply with Rule 14-B3a.

C. TRANSFORMER INSTALLATIONS ON CUSTOMER'S PREMISES

1. In cases where a Company transformer installation is made on a customer's premises, adequate space for the transformer installation shall be provided by the customer. Space provisions must be such that required clearances from adjacent structures can be maintained, and any vault, room or enclosure provided by the customer shall conform with applicable laws, ordinances, rules and regulations and shall meet with the approval of the Company.

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Service Connections and Facilities on Customer's Premises

2. Secondary Installations of 500 KVA or less

- a. The Company will erect a pole-type transformer structure at its expense and service from this structure will be supplied as specified by the Company.
- b. Where the customer has provided a vault or room, approved by the Company, at his expense, the installation will be made in accordance with subparagraph 3 b.
- c. Where the customer has provided a satisfactory concrete pad or foundation, fence, structure and necessary grounding to meet engineering construction standards of the Company the installation will be made in accordance with subparagraph 3 c.

3. Secondary Installations over 500 KVA

- a. The customer shall furnish suitable transformer space approved by the Company.
- b. Where the customer has provided a suitable vault or room, the customer shall also furnish and install, at his expense all secondary equipment, grounding, ventilation equipment and other material necessary to receive service at the secondaries of the transformers or the secondary bus, to meet engineering specifications of the Company.
- c. Where transformer and switching equipment is to be located outdoors, the customer shall provide and maintain at his expense a satisfactory concrete pad or foundation, fence, structure and necessary grounding to meet engineering construction specification of the Company. The customer shall also furnish and install at his expense all secondary equipment and material necessary to receive service at the secondaries of the transformers or the secondary bus, to meet engineering specification of the Company. The Company will at its expense complete the installations.

D. OWNERSHIP AND MAINTENANCE OF FACILITIES

All transformers, meters, service wires, appurtenances, fixtures and other facilities installed by the Company upon the customer's premises for the purpose of delivering electric energy to the customer shall continue to be the property of the Company, and may be repaired or replaced by the Company at any time and removed at the termination of service.

No rent or other charge whatsoever shall be made against the Company for placing or maintaining such facilities upon the customer's premises. The customer shall exercise reasonable care to prevent the facilities of the Company on the customer's premises from being damaged or destroyed, and shall not make or break any connections thereto or attach any switches or other devices thereto, or relocate or otherwise interfere with such facilities, and in case any defect therein shall be discovered, shall promptly notify the Company thereof.

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Service Connections and Facilities on Customer's Premises

E. LOSS OR DAMAGE

In the event of loss or damage to the Company's property on the customer's premises caused intentionally or arising from neglect, carelessness or misuse by anyone on the customer's premises, the cost of necessary repairs or replacement shall be at the expense of the customer.

F. CUSTOMER RESPONSIBILITY FOR HIS EQUIPMENT

The customer shall, at his own sole risk and expense, furnish, install, inspect and keep in good and safe condition all electrical wires, lines, machinery, apparatus and equipment of any kind or character which may be required for: (1) receiving electric energy from the lines of the Company, regardless of the location of the transformers, meters or other equipment of the Company; and (2) applying and utilizing such energy, including all necessary protective equipment and suitable housing therefor.

The customer shall also transmit and deliver and be solely responsible for the transmission and delivery of all electric energy over or through the customer's wires and equipment, regardless of the place where the electric energy may be transformed or metered.

The Company will not be responsible for any loss or damage occasioned or caused by the negligence, want of proper care or wrongful act of the customer, his agents, employees or licensees in installing lines, machinery, apparatus or equipment.

G. RIGHT OF ACCESS

The Company shall have the right of ingress to and egress from a customer's premises at all reasonable hours for any purposes reasonably connected with the furnishing of electric energy and the exercise of any and all rights secured to it by law or the tariff.

RULE No. 14 (Continued)

Service Connections and Facilities on Customer's Premises

H. INTERCONNECTION OF DISTRIBUTED GENERATING FACILITIES WITH  
THE COMPANY'S DISTRIBUTION SYSTEM

1. Interconnection Standards

- a. Distributed generating facilities interconnected to the Company's electric system shall satisfy the Company's Interconnection Standards.
- b. The Company's Interconnection Standards are included as Appendix I to Rule 14.

2. Definitions

For purposes of this Rule 14H, the following definitions shall apply:

- a. "Distributed Generation Facility": A Generating Facility located on a Customer's premises that is interconnected with the Distribution System.
- b. "Distribution System": All electrical wires, equipment and other facilities at the distribution voltage levels (such as 25kV-HECO only, 12kV, 4kV or 2.4kV) owned or provided by the utility, through which the utility provides electrical service to its customers.
- c. "Generating Facility": Customer or utility-owned electrical power generation that is interconnected to the utility.
- d. "Interconnect" or "interconnected" or "interconnection": The physical connection of any Distributed Generating Facility to the Distribution System, including the facilities required to provide the electric distribution service to a Customer, using electrical wires, switches, and related equipment located on either side of the point of common coupling as appropriate to their purpose and design to allow the physical connection of a Distributed Generating Facility to the Distribution System.

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- e. "Momentary Parallel Operation": Parallel Operation for a duration less than 100 ms.
  - f. "Parallel operation": The operation of a Distributed Generating Facility, while interconnected, such that customer load can be fed by the Distributed Generating Facility and Distribution System simultaneously.
3. Interconnection Agreement
- a. Customers, on whose premises Distributed Generating Facilities that are interconnected to the Company's Distribution System are located, shall complete and execute Standard Interconnection Agreement with the Company provided in Appendix II or Appendix II-A of this Rule, or an Application for Non-Export Distributed Generation Facilities (Momentary-Parallel Operation) provided in Appendix II-B of this Rule, or other Company-approved application for interconnection of a Generating Facility subject to Rule 14H, and obtain Company approval of such interconnection application prior to interconnecting the Distributed Generating Facilities to the Company's Distribution System, or within one hundred fifty (150) days after the effective date of this Rule if the distributed generating facilities are already operating in parallel with the Company's system as of such date, provided that following the expiration of such one hundred fifty (150) days period, Customers shall have thirty (30) days to file a request for an extension of such one hundred fifty (150) days period with the Commission for good cause shown. The Company shall not deem the Customer to be in violation of Rule 14H while the Customer's request for extension of time to complete and execute the Standard Interconnection Agreement is under consideration by the Commission. Nothing in this provision shall affect the Company's right to refuse or discontinue service as provided in Rules 7.A.1 and 2.

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- b. Distributed Generating Facilities may be interconnected to the Company's Distribution System in accordance with the terms and conditions of the Standard Interconnection Agreement or other interconnection agreement approved by the Company.
- c. The Standard Interconnection Agreement does not apply when (1) the Customer enters into a power purchase agreement for the sale to the Company of electric energy generated by the Distributed Generating Facility, (2) the Customer enters into a standard agreement providing for net energy metering pursuant to Rule No. 18, (3) the customer submits an application for Non-Export Distributed Generation Facilities (Momentary-Parallel Operation) provided in Appendix II-B of this Rule or (4) the Customer enters into any other standard interconnection agreement for a Generating Facility that is governed by Rule 14H. A customer that has an executed interconnection agreement with the Company as of the effective date of this rule shall not be required to enter into the Standard Interconnection Agreement until such time as the existing interconnection agreement is terminated.
- d. Customers with Distributed Generating Facilities that are eligible for net energy metering pursuant to Chapter 269 of the Hawaii Revised Statutes, shall follow the rules and requirements set forth in Rule No. 18 for Net Energy Metering and this Rule No. 14H, as applicable.
- e. Distributed Generating Facilities that incorporate the use of an energy storage device, e.g. battery storage, shall obtain an interconnection review by the Company pursuant to this Rule 14H and satisfy the Company's Interconnection Standards.
- f. With respect to any purported assignment of a Company-approved interconnection agreement due to a change in ownership of the related Generating Facility, the Company may permit a Customer-Generator or Owner/Operator, as applicable, to complete, execute and return to Company an Assumption of DER Interconnection Agreement in a form acceptable to Company in lieu of executing a new interconnection agreement.

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4. Interconnection Process

- a. Customer requests to interconnect Distributed Generating Facilities to the Company's Distribution System under the Standard Interconnection Agreement provided in Appendix II or Appendix II-A, or other Company-approved application for interconnection of a Generating Facility subject to this Rule, will be processed in accordance with the procedures in the Interconnection Process Overview, which is included in Appendix III of this Rule.
- b. Distributed Generating Facilities that are interconnected but will not operate in parallel with the Company's Distribution System, are not subject to the interconnection review process under this Rule 14H except that Customer shall register such Distributed Generation Facilities by completing and submitting an Application for Non-Export Distributed Generation Facilities provided in Appendix II-B to this Rule 14H. Such registration shall satisfy the Customer's notice requirements set forth in Tariff Rule 3B (Change In Customer's Equipment Or Operations) and is required for purposes of determining potential load that the Company may be required to serve.
- c. Generators that are not interconnected with the Company's Distribution System are not subject to the interconnection review process under this Rule 14H and are not required to be registered with the Company.
- d. The Interconnection Process Overview addresses the steps in the interconnection process, the technical review process, the need for additional study, and the resolution of disputes.

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## **APPENDIX I**

### **Distributed Generating Facility Interconnection Standards Technical Requirements**

The following interconnection standards are intended to provide general technical guidelines and procedures to facilitate the interconnection and parallel operation of distributed generating facilities with Hawaii Electric Light Company, Inc.'s (HELCO, Company or utility) electrical distribution system. If there is a conflict between the technical specifications set forth in this Appendix I with any technical specifications set forth elsewhere in HELCO's Distributed Generating Facility Interconnection tariff, the specifications of this Appendix I shall prevail. The specific characteristics or needs of each distributed generating facility may reduce or increase its interconnection requirements. The degree of technical review required for a request for interconnection, and the extent to which an Interconnection Requirements Study (IRS) will be needed, will depend on factors such as the size of the generating facility, the type of technology and the point on the utility's system at which the generating facility will be interconnected. (See Interconnection Process Overview, Appendix III.) These technical interconnection requirements have been established to maintain safety, reliability, and power quality standards for all utility customers and personnel under the objectives described below:

#### **Objectives of Good Interconnection Practice**

- **Safety** – To protect the safety of utility personnel, utility customers, and the public.
- **Reliability** – To maintain the reliability of the utility system for all utility customers.
- **Power Quality** – To provide for acceptable power quality<sup>1</sup> and voltage regulation on the utility system and for all utility customers.
- **Restoration** – To facilitate restoration of power on the utility system.
- **Protect Utility and Customer Equipment** – To protect utility and customer equipment during steady state and faulted system operating conditions.
- **Protect Generating Facilities** – To protect generating facilities from operation of utility protective and voltage regulation equipment.
- **Utility System Overcurrent Devices** – To maintain proper operation of the utility system's overcurrent protection equipment.
- **Utility System Operating Efficiency** – To ensure operation at appropriate power factors and minimize system losses.

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<sup>1</sup> "Acceptable" power quality is power delivered to customers that does not impair operation of the customers' equipment or cause visible light flickering due to voltage fluctuations under normal operating conditions. One element of power quality is voltage flicker, which is a function of the magnitude of voltage fluctuation and the frequency at which the fluctuation occurs. Voltage flicker is described in Section 4.n. of this Appendix I.

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### **Consistency with Codes and Standards**

These technical interconnection standards are based on the requirements of IEEE<sup>2</sup> 1547-2003 *Standard for Interconnecting Distributed Resources with Electric Power Systems* (or latest version, including amendments such as, IEEE 1547a-2014). HELCO intends to maintain consistency between its requirements for interconnection of distributed generating facilities and IEEE interconnection standards to the extent feasible, considering the specific design and operating requirements of HELCO's electric power system.<sup>3</sup> Except as otherwise provided herein, HELCO will evaluate all future revisions to IEEE standards directly related to interconnection of distributed generating facilities, if any, and update its Distributed Generating Facility Interconnection Standards Technical Requirements accordingly. If, as a result of reviewing such revised or new IEEE standards HELCO determines that an update to its Rule 14H is required, HELCO shall file a request with the Commission to modify its interconnection tariff. If, as a result of reviewing such revised or new IEEE standards HELCO determines that an update to its Rule 14H is not required, HELCO will provide a written explanation of its determination in its Rule 14H annual report to the Commission. HELCO will also provide a written explanation of its determinations concerning IEEE distributed generation interconnection standards to interested parties upon request, or will make such information available on a publicly accessible website.

Any use of an Advanced Inverter shall utilize UL1741 – Supplement SA (or latest applicable version) to certify the Advanced Inverter functions specified in section 4A.

**Customers are encouraged to review and discuss these technical interconnection standards with the utility before proceeding with their design and procurement of distributed generating facility equipment.**

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<sup>2</sup> IEEE – Institute of Electrical and Electronic Engineers. The IEEE standards or products referred to herein are trademarks owned by The Institute of Electrical and Electronics Engineers, Incorporated. IEEE publications are available from the Institute of Electrical and Electronics Engineers (<http://standards.ieee.org/>)

<sup>3</sup> IEEE 1547-2003 does not address planning, designing, operating, or maintaining the area electric power system (IEEE 1547-2003, Section 1.3).

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## 1. **Definitions**

For the purposes of this Rule, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this Appendix.

- a. Active Anti-Islanding Scheme: Equipment or control schemes installed with the Generating Facility that prevents the formation of an unintended island.
- b. Advanced Inverter: A Generating Facility's Inverter that performs functions that when activated, can autonomously contribute to grid support by providing: dynamic reactive/real power support, voltage and frequency Ride-Through, ramp rate controls, communication systems with ability to accept external commands, and other functions.
- c. Cease to Energize: Cessation of active current exchange related to the active power production of the Advanced Inverter with the Distribution, Subtransmission, or Transmission System in not more than the maximum specified time. Cease to Energize does not necessarily imply galvanic separation or a Trip of the grid connected Advanced Inverter
- d. Clearing Time: The time between the abnormal voltage being applied and the generating facility ceasing to energize the utility distribution system.
- e. Continuous Operation: The generating facility operates indefinitely without tripping. Any functions that protect the Advanced Inverter from damage may operate as needed.
- f. Customer insurance coverage: Consistent with Appendix III, Section 5, the Customer shall maintain insurance coverage or be self insured against risks arising under the interconnection agreement. Proof of Customer Insurance Coverage will be included as Exhibit D to an interconnection agreement entered between the Company and the Customer.
- g. Dedicated Transformer: A transformer that provides electrical service to a single customer.
- h. Distribution System: All electrical wires, equipment, and other facilities at the distribution voltage levels (such as 25kV-HECO only, 12kV, or 4kV) owned or provided by the utility, through which the utility provides electrical service to its customers.

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- i. Direct Transfer Trip: Automatic remote trip of a generating facility's circuit breaker or interrupting device by means of a communication channel that is acceptable to the utility.<sup>4</sup>
- j. Electric Power System - Equipment or facilities that deliver electric power to a load. The most common example of an EPS is the electric grid of the respective island utility (i.e. the utility's Distribution System, Subtransmission System, and/or Transmission System).
- k. Facility Equipment List: Identifies equipment, space, and/or data at the Generating Facility location to be provided by the Customer for use in conjunction with the Company's Interconnection Facilities. The Facility Equipment List will be included as Exhibit B to any interconnection agreement entered between the Company and the Customer.
- l. Generating Facility (or Generating Facilities): Customer or utility-owned electrical power generation that is interconnected to the utility.
- m. Induction Generator: A rotating machine generator that converts mechanical power to electrical power, in which the rotor current creating the magnetic field is supplied by an external AC source, usually the electric utility system.
- n. Initial Technical Review: Pursuant to Appendix III, Section 2, the review by the Company following receipt of an Interconnection Application to determine the following: a) if the Generating Facility qualifies for Simplified Interconnection; or b) if the Generating Facility can be made to qualify for interconnection with a Supplemental Review determining additional requirements, if any.
- o. Interconnection Application: Completion of one of the two applicable Commission-approved forms in Exhibit A of Appendix II or II-A hereto, or other Company-approved application for interconnection of a Generating Facility governed by Rule 14H submitted to the Company for interconnection of a Generating Facility.

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<sup>4</sup> Acceptance of the communications channel depends upon the speed of the operation, availability (up time), reliability, security, and type of electrical interface equipment used. The criteria for selecting the type of acceptable communications are the levels of guaranteed priority for restoration response, maintenance, and system upgrades in order to maximize availability, reliability, and security. Other technical communications channel requirements are determined by the manufacturers of the electrical interface equipment used.



- p. Interconnection Facilities: The electrical wires, switches and related equipment that are required in addition to the facilities required to provide electric distribution service to a Customer to allow interconnection. Interconnection Facilities may be located on either side of the Point of Interconnection as appropriate to their purpose and design. Interconnection Facilities may be integral to a Generating Facility or provided separately.
- q. Interconnection Requirements Study (or "IRS"): Pursuant to Appendix III, Section 4, a study to establish the requirements for interconnection of a Generating Facility with the Company's Distribution System.
- r. Inverter System: A machine, device, or system that changes direct-current power to alternating-current power.
- s. Line Section: The portion of the Company's Distribution System connected to a Customer bounded by automatic sectionalizing devices, or the end of a distribution line. Where a radial distribution circuit does not have automatic sectionalizing devices, the whole circuit is considered one line section. A fuse must be manually replaced and is therefore not considered an automatic sectionalizing device.
- t. Mandatory Operation: The Advanced Inverter shall continue to exchange active current and reactive current with Electric Power System as prescribed, notwithstanding disturbances of the Electric Power System voltage or frequency having magnitude and duration severity within defined limits.
- t1. Maximum Site Load Without Generation: maximum amount of load at the premises where the Generating Facility is interconnected, irrespective of any offsetting generation.
- t2. Minimum Site Load Without Generation: minimum amount of load at the premises where the Generating Facility is interconnected, irrespective of any offsetting generation.
- u. Momentary Cessation: Temporarily Cease to Energize in response to a voltage or frequency disturbance, with the capability of immediate restore output of operation when the Electric Power System voltage and frequency return to within defined ranges.
- v. Network System: An electrical system in which two or more utility feeder sources are electrically tied together on the primary or secondary voltage level to form one power source for one or more customers. The network system is designed to provide higher reliability for customers connected to it.

- w. Parallel Operation: The operation of a Distributed Generating Facility, while interconnected, such that customer load can be fed by the Distributed Generating Facility and Distribution System simultaneously.
- x. Open Loop Response Time: See, also, Response Time.
- y. Permissive Operation: In response to an abnormal excursion, the Generating Facility is allowed, but not required, to operate at any current level.
- z. Point of Interconnection: The point at which the utility and the customer interface occurs.

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Transmittal Letter Dated October 22, 2018

- aa. P<sub>pre</sub> predisturbance (P<sub>pre</sub>): Is the active power output level of the Advanced Inverter immediately prior to the disturbance, in p.u. of the Advanced Inverter rating.
- bb. P<sub>rated</sub> rated (P<sub>rated</sub>): Is the rated active power, in p.u. of the Advanced Inverter rating (i.e., 1.0 p.u.) Note: P<sub>rated</sub> mode may be used in special cases and by mutual agreement between the Customer-Generator and the utility.
- bb1. Program System Size: Program Size as used herein applies to photovoltaic inverter-based generation. Program Size for all other types of Generating Facilities will be handled on a case-by-case basis. A photovoltaic inverter-based Generating Facility's Program Size is calculated as the sum of all inverter strings. Each inverter string is calculated as the sum of the photovoltaic kW<sub>dc</sub> capacity per inverter string or the inverter kW<sub>ac</sub> capacity per inverter string, whichever is less. Program Size is used for program administration, and to determine insurance requirements.
- cc. Response Time or Open Loop Response Time: The time duration between a control signal input step change (reference value or system quantity) and the point in time when the output reaches 90% of its final change, (before an overshoot). For example, in volt-watt mode, the Response Time is the time from a change in voltage till the corresponding change in Advanced Inverter output power.
- dd. Return to Service: The criteria required for and behavior of the Advanced Inverter as it re-energizes the Electric Power System following an abnormal excursion resulting in a Trip, Cease to Energize, or Momentary Cessation operation.

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- ee. Ride-Through: The ability to withstand voltage or frequency excursions outside defined limits without tripping or malfunctioning. While the Advanced Inverter is in Ride-Through state, the SRD may require particular action such as Momentary Cessation or Mandatory Operation.
- ff. Settling Time: See Response Time.
- gg. Short Circuit Contribution Ratio (SCCR): The SCCR evaluates the short circuit current contribution of the Generating Facility in two ways. First the SCCR looks at the ratio of the Generating Facility short circuit contribution to the short circuit contribution of the utility system for a three-phase fault at the high voltage side of the customer or utility transformer connecting the generating facility to the utility (aggregate SCCR must be less than or equal to 10%). Second, it compares the Generating Facility short circuit current to the interrupt rating of the customer's service panel to ensure that the customer's equipment will not be overloaded.
- hh. Simplified Interconnection: Interconnection conforming to the Initial Technical Review requirements of Appendix III, Section 2 and 3.
- ii. Subtransmission System: All electrical wires, equipment, and other facilities at the subtransmission voltage levels (such as 46kV, 35kV, or 23kV) owned or provided by the utility, through which the utility provides electrical service to its customers.
- jj. Source Requirements Document: A document that includes the required operational functions, operating parameters including limits and response times for Advanced Inverter testing.
- kk. Supervisory Control: Remote monitoring and/or control of a generating facility's power output and interrupting device status by means of a communication channel (see footnote number 2) that is acceptable to the utility.
- ll. Supplemental Review: Pursuant to Appendix III, Section 3, a process wherein the Company further reviews an Interconnection Application that fails one or more of the Initial Technical Review screens. The intent of the Supplemental Review is to provide a slightly more detailed review of only the conditions that cause the Generating Facility generator to fail the Initial Technical Review. The Supplemental Review may result in one of the following: a) approval of interconnection; b) approval of interconnection with additional requirements; or c) cost and schedule for an Interconnection Requirements Study.

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mm. Synchronous Generator: A rotating machine generator that converts mechanical power into electrical power, in which the rotor current creating the magnetic field comes from a separate DC source or the generator itself.

mm1. Technical System Size: Technical System Size as used herein applies to photovoltaic inverter-based generation, including those paired with energy storage systems. Technical System Size for all other types of Generating Facilities will be handled on a case-by-case basis. Technical System Size refers to the maximum possible simultaneous generation (including discharge of energy storage systems) of the Generating Facility, and is calculated as the lesser of the sum of all inverter strings of the aggregate system or the maximum amount of export as permitted by the existence of an on-site limiting element that caps the amount of the Generating Facility's export at the Point of Common Coupling ("PCC"). Each inverter string is calculated as the sum of all simultaneous kWdc per inverter string or the inverter kWac per inverter string, whichever is less. Technical System Size is used as part of the technical review process as described herein.

nn. Transmission System: All electrical wires, equipment, and other facilities at the transmission voltage levels (such as 138kV or 69kV) owned or provided by the utility, through which the utility provides electrical service to its customers.

oo. Unintended Islanding: Islanding is a condition in which one or more Generating Facilities deliver power to a utility customer or customers using a portion of the utility's Distribution System that is electrically isolated from the remainder of the utility's Distribution System in a manner that is not intended. Unintended islanding may occur following an unanticipated loss of a portion of the utility Distribution System.

pp. Utility-grade Protective Equipment: Protective equipment that meets requirements defined by:

- ANSI/IEEE C37.90-1989 IEEE Standards for Relays and Relay Systems Associated with Electric Power Apparatus
- IEEE C37.90.1 IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems
- IEEE C37.90.2 IEEE Trial-Use Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

## **2. General Interconnection Guidelines**

- a. **Compliance with Laws and Codes:** The generating facility, protection, interconnection equipment, design, and design drawings shall meet all applicable national, state, and local laws, including construction and safety codes. The following construction and safety codes shall be followed for the design and construction of all distributed generating facility installations to ensure the safety of the public, customer, and utility personnel. These codes include, but are not limited to, the following:
- National Electric Code (NEC)
  - National Electrical Safety Code (NESC)
  - National Fire Protection Association (NFPA) Building Code
  - Hawaii County Building Code
  - Uniform Building Code (UBC)
  - American Concrete Institute (ACI)
  - American Institute of Steel Construction (AISC)
  - American Association of State Highways & Transportation Officials (AASHTO)
- b. **Notification for Supplemental Review:** With regard to the potential need for Supplemental Review referenced in various sections of this Appendix I, as described in section 1 of Appendix III (Interconnection Process Overview) to Rule 14H, upon Company's determination that Supplemental Review will be required based on the results of the Initial Technical Review, the Company shall notify the customer in writing within fifteen (15) business days, or such other period as is mutually agreed upon in writing between the Company and the customer, following the Initial Technical Review or any Supplemental Review required and the reasons for such review.
- c. **Export of Power:** Generating facilities intending to export power to the utility that will cause a reversal of power flow at any voltage regulation device that is not bi-directional may require Supplemental Review or an IRS that will be completed by the Company to evaluate the impacts on equipment ratings and protective relay settings. If an IRS is required, analyses such as a Feeder Load Flow, Dynamic Stability Analysis, Transient Overvoltage, Short Circuit and Relay Coordination may need to be performed in order to evaluate the impacts of the export of power on equipment ratings and protective relay settings. Generating facilities that export power to the utility system may change the direction of power flow on the utility system. The magnitude of the change in power flow will be a function of the aggregate amount of export power on a feeder, the location of the generating facilities exporting power on a feeder, the feeder load, and the location of loads on a feeder. The need for an IRS will depend on these factors.

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- d. Utility Feeder Penetration: As the penetration of generating capacity increases on the utility distribution feeder, there is increased risk of voltage regulation problems, adverse interactions with the utility's protection system, and unintended islanding. Therefore, Supplemental Review to examine the risk of voltage regulation problems, protection malfunction from reverse power flow, and unintended islanding may be required when the aggregate generating capacity per distribution line section exceeds 15% of the annual peak KVA load of the line section. If an IRS is required, analyses such as a Feeder Load Flow, Dynamic Stability Analysis, Transient Overvoltage, Short Circuit and Relay Coordination may need to be performed in order to evaluate the risk of voltage regulation problems, protection malfunction from reverse power flow and unintended islanding. The need for an IRS will be identified by the Company during Supplemental Review.

To avoid excessive unbalanced loading on the utility distribution feeder, interconnection of 1-phase generating facilities with a capacity greater than 10kW shall be reviewed by the Company in its Initial Technical Review. Based upon the results of the Initial Technical Review, the Company may determine that Supplemental Review is necessary.

- e. Short Circuit Contribution Ratio (SCCR): A generating facility's short circuit current contribution to the utility distribution feeder can affect operation of existing utility protective devices. A good indicator of the potential impact of a generating facility's short circuit contribution is the Short Circuit Contribution Ratio. To ensure the operation of existing utility protective devices is not compromised, Supplemental Review will be required if the sum of the SCCR of all Generating Facilities on the Distribution System circuit exceeds 10% when measured at the primary side of a dedicated distribution transformer, or the short circuit contribution of the proposed generating facility is greater than 2.5% of the interrupting rating of the Customer Generator's Service Equipment when measured at secondary side of a shared distribution transformer. Analyses such as Short Circuit and Relay Coordination may need to be performed. The need for such analysis will be identified by the Company during Supplemental Review.
- f. Network Interconnection: Connection of generating facilities on utility distribution network systems shall be reviewed by the Company in its Initial Technical Review of the impact of the distributed generating facility on the Company's system. Based upon the results of the Initial Technical Review, the Company may determine that Supplemental Review of the network interconnection is necessary.
- g. Interconnection of Generating Facility: Once any generating facility has been interconnected to the Company's system, the Company reserves the right to

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require the installation of, or modifications to, equipment determined by the utility to be necessary to facilitate the delivery of reliable electric service to its customers, provided that the costs associated with such post interconnection installations or modifications shall be paid by the utility or through other mechanisms approved by the Commission.

### **3. Design Requirements**

- a. Integration with Utility Grounding and Ground System Protection: The grounding scheme and the ground fault protection of the generating facility shall be coordinated with the utility system to ensure a ground fault is properly cleared on the utility system. Any ground faults detected by the utility protection scheme (for faults on the utility feeder between the utility substation and the generating facility) must also be detected by the protection scheme of the generating facility. For a single line to ground fault on the connecting utility feeder, the generating facility's ground fault protection must be sufficient to prevent damage to the utility system and other customer equipment due to overvoltage caused by ferroresonance, displaced neutral, or self-excitation. The generating facility must disconnect before the utility breaker recloses automatically.
- b. Transformer Winding Configuration: The transformer winding configuration of the customer or utility distribution transformer serving the generating facility shall be reviewed by the Company in its Initial Technical Review to determine the potential impact to the utility system and generating facility, and subsequent interconnection requirements. Refer to typical single-line diagrams in Figures 1-3. Based upon the results of the Line Configuration Screen of the Initial Technical Review, the Company may determine that Supplemental Review of the transformer winding configuration is necessary.
- c. Isolation Device: The customer shall furnish and install a manual isolation device that has a visible break to isolate their generating facility from the utility distribution system. The isolation device shall either be a disconnect switch or a breaker with rack-out capability. The device must be accessible to utility personnel and be capable of being locked by utility personnel in the open position. For generating facilities that do not have a circuit breaker or interrupting device, the isolation device must be capable of interrupting load. An existing service disconnect device may be used if it meets these requirements. Attach a label indicating "Customer Generating Facility" to the generator isolation device.
- d. Interrupting Device: Applicable circuit breakers or interrupting devices at the generating facility must be capable of interrupting the maximum available fault current at the site, including any contribution from the generating facility. For

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generating facilities that are greater than 10kW, the interrupting device must be accessible to utility personnel at all times.

- e. Dedicated Transformer: The utility may require the generating facility to install a dedicated transformer, where the generating facility is served from the same transformer secondary as another utility customer and if inverter-based technology is used that does not meet IEEE 519-2014 (or latest versions) specifications. A dedicated transformer or other current-limiting device is needed for any type of generating facility where the increase in available short circuit current could adversely impact other utility customers on the same secondary circuit (i.e., the short circuit contribution of the generating facility must not increase the available short circuit current to the other utility customers on the same secondary circuit such that the ratings of their equipment and protective devices are exceeded). Based upon the results of the Initial Technical Review or Supplemental Review, the Company shall determine whether an adverse impact may occur and whether a dedicated transformer is necessary. In accordance with Section 1.c of Appendix III, the Company shall provide the customer with final results of all technical screenings and Supplemental Review in writing, and shall notify the customer of such determination and the reasons for such determination as part of the written results.
- f. Supervisory Control: For generating facilities with an aggregate capacity greater than 250 kW, computerized supervisory control shall be required to ensure the safety of working personnel and prompt response to system abnormalities in case of islanding of the generating facility. Supervisory control shall not be required for generating facilities with an aggregate capacity of 250 kW or less.

Supervisory control shall include monitoring of: (a) gross generation by the generating facility; (b) feedback of Watts, Vars, WattHours, current and voltage; (c) Vars furnished by the utility; and (d) status of the interrupting device. In addition, the supervisory control will allow the utility to trip the interrupting device during emergency conditions.<sup>5</sup> Monitoring will be

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<sup>5</sup> Emergency conditions refer to the need for immediate action in response to a situation that has caused injury, loss of life or property damage. Emergency conditions include, but are not limited to:

A system emergency or forced outage;

A potential hazard to Company personnel or the general public;

A hazardous condition relating to the generating facility;

The generating facility is interfering with the Company's equipment or equipment belonging to other customers (including non-utility generating equipment);

The generating facility's protective devices have been tampered with by the customer and/or owner and/or operator of the generating facility; or

A need for immediate action in response to a situation that has caused (or has the potential to cause) injury, loss of life or property damage.

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performed by system dispatchers or operators at the Company's control center.

- g. Surge Capability: The generating facility interconnection equipment and relays shall have the capability to withstand voltage and current surges in accordance with IEEE/ANSI Standard C62.41 or IEEE Standard C37.90.1 as appropriate.
- h. Equipment Testing: The generating facility shall provide to the utility the manufacturer's brochures/instruction manuals and technical specifications of their proposed generating facility equipment, and test reports for evaluation by the utility.

In addition, verification tests of customer-owned equipment shall be performed on-site by customer to verify protective settings and functionality to ensure that the equipment will not adversely affect the utility distribution system and that it will cease providing power to the system under abnormal conditions. A verification test shall be performed upon initial parallel operation of the generating facility, or whenever interface hardware or software is changed that can affect the protective functions. These tests shall be done by a qualified individual (hired or employed by the customer) in accordance with the manufacturer's recommended test procedure and in concurrence with the utility. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment.<sup>6</sup> To ensure that verification tests of customer-owned equipment are performed correctly, the utility may request to witness the tests and receive written certification of the results from the qualified individual. The customer must inform the Company in writing of proposed changes in the customer's interconnection hardware or software that are related to the performance, operation, or timing of the protective functions not later than fifteen (15) business days prior to implementation of such changes. Upon receiving notice of such proposed changes from the customer, the Company must notify the customer in writing of any concerns regarding the proposed changes within fifteen (15) business days, in which case the changes shall not be implemented until the customer and Company resolve the concerns to their mutual satisfaction and document the resolution in writing.

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<sup>6</sup> Also see the Standard Interconnection Agreement, Exhibit B, paragraph 2.a. (Sheet No. 38C-19).  
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All interconnection-related protective functions and transfer trip schemes, if applicable, shall be periodically tested at intervals specified by the manufacturer, or in accordance with industry practice. (When the interval is not specified by the manufacturer or by the Company, protective functions should be tested every four years.) The customer shall submit or make available for inspection by the utility, test reports of such testing. Periodic testing conforming to the utility test intervals for the particular line section can be specified by the utility under special circumstances (e.g., where the generating facility is connected to a utility feeder that has experienced high frequency of outages due to natural or unnatural causes such as in coastal areas where there are high winds). The Company will determine whether special circumstances exist, and must inform the customer in writing of any such determination and the reasons for that determination. A system that depends upon a battery for trip power shall be checked and logged once per month for proper voltage, or monitored continuously.

#### **4. Operating Requirements**

This Section 4 shall apply to non-inverter based Generating Facilities. For inverter based Generating Facilities, see Section 4A (Advanced Inverter Generating Facility Design and Operating Requirements).

- a. Disconnection of Generating Facility for Utility Reasons: Upon providing reasonable notice (generally not to be less than ten (10) business days for scheduled work), the utility may require the generating facility to temporarily disconnect from the utility's system when necessary for the utility to construct, install, maintain, repair, replace, remove, investigate, test, or inspect any of its equipment or other utility customer's equipment, or any part of its system. The generating facility shall not energize a de-energized utility line under any circumstances, but may operate isolated from the utility system with an open tie point in accordance with Section 4.i.

If the utility determines that such disconnection is necessary because of unexpected system emergencies, forced outages, operating conditions on the utility's system, or compliance with good engineering practices as determined by the Company's engineers and/or operations personnel, the Company will immediately attempt to notify, in person, by telephone, by electronic mail, or by facsimile, the customer's designated representatives of the need to disconnect the customer's generating facility. Unless the emergency condition requires immediate disconnection as determined by the utility, the Company shall allow sufficient time for the generating facility operator to manually disconnect the generator. (As stated in Section 4.b below, there are circumstances where the utility may disconnect the generating facility without prior notice to the Customer.)

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Following the completion of work and/or rectification of the emergency conditions by the utility, the utility shall reset the Customer's isolation device, if open, as soon as practicable and shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the utility and the customer, written documentation of the occurrence and nature of the utility's work and/or emergency condition, and the disconnection of the customer's generating facility.

The utility shall take reasonable steps to minimize the number and duration of such disconnections. The utility may disconnect the customer from the utility's system for failure by the customer to disconnect their generating facility under this Section 4.a, until such time that the utility work or emergency condition has been corrected and the normal system condition has been restored.

The generating facility may be disconnected by the utility at the facility location or remotely by supervisory control, if available.

- b. Personnel and System Safety: The utility may disconnect the generating facility from the utility's system, without prior notice to the customer: (a) to eliminate conditions that constitute a potential hazard to the utility's personnel or the general public; (b) if pre-emergency<sup>7</sup> or emergency conditions<sup>5</sup> exist on the utility system; (c) if a hazardous condition relating to the generating facility is observed by the utility's inspection; (d) if the generating facility interferes with the utility's equipment or equipment belonging to other utility customers (including non-utility generating equipment); or (e) if the customer or a party with whom the customer has contracted for ownership and/or operation of the generating facility has tampered with any protective device. The generating facility shall remain disconnected until such time as the utility is satisfied that the endangering condition(s) has been corrected, and the utility shall not be obligated to allow parallel operation of the generating facility during such period. If the utility disconnects the generating facility under this Section 4.b, it shall as soon as practicable notify the customer in person, by telephone, by electronic mail, or by facsimile and provide the reason(s) why the generating facility was disconnected from the Company's system. Following the rectification of the endangering conditions, the utility shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the utility and the customer, written documentation of the occurrence and nature of the endangering conditions, and the disconnection of the customer's generating facility.

The generating facility may be disconnected by the utility at the facility location or remotely by supervisory control, if available.

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<sup>7</sup> Pre-emergency conditions refer to the need for immediate action in response to a situation that has the potential to cause injury, loss of life, or property damage.

- c. Synchronization: Upon connection, the generating facility shall synchronize with the utility distribution system. Synchronization means that at the Point of Interconnection, the frequency difference shall be less than 0.2 Hz from rated frequency, the voltage difference shall be less than 5% of nominal voltage, and the phase angle difference shall be less than 10 degrees.
- d. Voltage Regulation: Unless specifically requested by the utility, the generating facility shall not attempt to control or regulate the utility system voltage while operating in parallel with the utility distribution system.

The generating facility shall not degrade the normal voltage provided by the utility outside the limits stated in the utility tariff (□ 5% of nominal voltage)

- a. Unintended Islanding: For public and utility personnel safety and to prevent possible damage to customer equipment, the generating facility shall be equipped with protective equipment designed to prevent the generating facility from being connected in parallel with a de-energized utility line. The generating facility must automatically disconnect from the utility distribution system upon loss of utility source, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j). Protective device requirements, such as direct transfer trip, grounding bank, or active anti-islanding scheme, shall be determined by the Company based upon the results of the Initial Technical Review and/or Supplemental Review.
- f. Disconnect for Faults: The generating facility shall be equipped with protective equipment designed to automatically disconnect the generating facility from the utility distribution system for faults on the utility distribution circuit to which it is connected, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j).

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- g. Voltage Disturbances: The generating facility shall be equipped with protective equipment designed to automatically disconnect the generating facility from the utility distribution system for voltages outside the normal operating range within the clearing time as indicated in the table below, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j). The protective equipment shall measure the RMS (root-mean-square) voltage at the Point of Interconnection.

<u>Voltage (% of base voltage)</u>	<u>Voltage (120V base)</u>	<u>Clearing Time</u>
$V < 50\%$	$V < 60$ volts	10 cycles
$50\% \leq V < 88\%$	$60 \text{ volts} \leq V < 106$ volts	120 cycles
$88\% \leq V \leq 110\%$	$106 \text{ volts} \leq V \leq 132$ volts	Normal Range
$110\% < V < 120\%$	$132 \text{ volts} < V < 144$ volts	60 cycles
$120\% \leq V$	$144 \text{ volts} \leq V$	10 cycles

For generating facilities  $\geq 30$ kW, the voltage set points and clearing times shall be adjustable to accommodate utility system requirements.

- h. Frequency Disturbances: The generating facility shall be equipped with protective equipment designed to automatically disconnect the generating facility from the utility distribution system when the frequency at the Point of Interconnection deviates outside the utility specified operating range set forth below, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j).

All generating facilities, including those with an aggregate capacity less than 30 kW, shall have frequency setpoints and clearing times selected by the utility and provided below, to coordinate with the utility's system relay settings. The generating facilities shall set protective equipment to (1) disconnect the generating facility within 10 cycles if the frequency exceeds 60.5 Hz, (2) be capable of time delayed disconnection of 300 seconds with the adjustable underfrequency setting set to 57.0 Hz, and (3) disconnect the generating facility within 10 cycles if the frequency is less than 57.0 Hz.

- i. Inadvertent Energization, Operation During Utility System Outage: The generating facility shall not energize a de-energized utility circuit for any reason. The generating facility may be operated isolated from the utility system during a utility outage or system emergency only with an open tie breaker or disconnect device which isolates the generating facility from the utility system. This shall generally be done through manual opening and lockout of the Customer's service breaker or isolation device (required under Section 3.c) by utility personnel prior to starting the generating facility.

Where customers desire the ability to manually or automatically isolate their generating facility from the utility system by themselves, the utility will

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consider alternative designs proposed by the Customer that will prevent inadvertent energization of a de-energized utility circuit. Such alternative design proposals shall be reviewed and approved in writing by the Company prior to implementation. The utility shall not unreasonably withhold such approval. Upon implementation of an alternative design approved by the Company, the Customer may isolate itself from the utility system during a utility outage and operate its generating facility. Customers' alternative designs may, subject to review and approval by the Company, enable customers to manually or automatically reconnect back to the utility system upon restoration of utility system power, provided that the utility has not locked out the customers' service as described below and subject to the delay requirements specified in Section 4.j.

In certain situations, including any time that utility personnel will be performing work on the distribution system serving the point of interconnection between the utility and Customer, the utility may determine the need to actively verify the open tie point, and to install a Company lock to ensure the safety of utility personnel. The Customer shall provide access to the isolation device required under Section 3.c for utility personnel to visually confirm the open tie point and install a Company lock if necessary. Following restoration of grid power or rectification of the emergency condition, the utility personnel shall, as soon as practicable, remove the Company lock to allow reconnection of the generating facility with the utility system.

Generators that are not interconnected to the utility's distribution system at any time and which are therefore not covered under an interconnection agreement may be operated by Customer at their discretion.

- j. Required Delay on Reconnection: The generating facility shall be equipped with automatic means to prevent reconnection of the generating facility with the utility distribution system until the utility service voltage and frequency are within the utility tariff normal operating ranges and stable for at least 5 minutes, unless earlier directed by the utility.
- k. Loss of Protection: Failure of the generating facility interconnection protection equipment, including loss of control power, shall result in the automatic disconnection of the generating facility from the utility distribution system until such time that the interconnection protection equipment has been restored. Such failure shall initiate a signal to trip a generating facility circuit breaker or shutdown an inverter. In the case of failure of Company-owned protection equipment, following the rectification of the loss of protection, the utility shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the utility and the customer, written documentation of the occurrence, and the disconnection of the customer's generating facility.

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- l. Reclosing Coordination: The generating facility shall be coordinated with the utility system reclosing devices, by disconnecting from the utility distribution system within the first reclose interval and remaining disconnected until the voltage and frequency have stabilized (see Section 4.j).
- m. Power Factor: The generating facility shall not adversely impact the power factor at the Point of Interconnection. Generating facilities shall operate at a power factor  $\geq 0.85$  (lagging or leading) Operation outside this range is acceptable provided the reactive power of the generating facility is used to meet the reactive power needs of the customer's internal loads or that reactive power is otherwise provided under utility tariff, and it does not adversely impact the utility system voltage as specified in Section 4.d. above.
- n. Voltage Flicker: Any voltage flicker at the Point of Interconnection caused by the generating facility shall not exceed the limits defined in IEEE Standard 1453-2015 "Recommended Practices for the Analysis of Fluctuating Installations on Power Systems" (or latest version). This requirement is necessary to minimize the adverse voltage effects upon other utility customers on the utility distribution system.
- o. Harmonics: Harmonic distortion at the Point of Interconnection caused by the generating facility shall not exceed the limits stated in IEEE Standard 519-2014 "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems" (or latest version). The customer is responsible for the installation of any necessary controls or hardware to limit the voltage and current harmonics generated from their generating facility to levels defined in IEEE Standard 519-2014.
- p. Direct Current Injection: The generating facility shall not inject DC current greater than 0.5% of the full rated output current into the utility distribution system at the Point of Interconnection under either normal or abnormal operating conditions. This applies primarily to generating facilities that use an inverter to interconnect with the utility system.
- q. Protection from Electromagnetic Interference (Immunity Protection): The influence of electromagnetic interference (EMI) shall not result in a change in state or misoperation of the generating facility interconnection system.
- r. Disconnection of Customer Generating Facilities: Except as otherwise provided herein, the disconnection of a customer's generating facility shall not be subject to standby charges provided that the disconnection was caused by the utility or by the failure of the utility's equipment, or the disconnection was requested or required by the utility due to reasons other than problems caused by the customer's generating facility. The procedure for determining the applicability of standby charges to a disconnection event shall be specified in the Company's Schedule SS Standby Service tariff.

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#### **4A. Advanced Inverter Generating Facility Operating Requirements**

This Section 4A (Advanced Inverter Generating Facility Operating Requirements) shall apply for interconnection of all inverter based Generating Facilities which shall be certified to UL-1741 Supplement SA Standard for Grid Support Utility Interactive Inverters and Converters using the applicable utility Source Requirements Document (see, <https://www.hawaiianelectric.com/clean-energy-hawaii/producing-clean-energy>, "Grid Supportive Utility Interactive Inverter Certification Requirements") at the time of the Interconnection Application.

Inverter based Generating Facilities that were granted interconnection approval<sup>8</sup> on or after January 1, 2016 and before or on the effective date of this tariff shall be updated, at the expense of the Generating Facility Owner, with the Advanced Inverter requirements set forth in this Section 4A no later than twelve (12) months after the date the UL-1741 Supplement SA is approved by the full UL-1741 Standards Technical Panel or March 10, 2018, i.e. twelve (12) months after the issue date of Source Requirements Document version 1.0, whichever is later (the "Certification Deadline Date").

Until the Certification Deadline Date, or other time period ordered by the Hawaii Public Utilities Commission, inverter based Generating Facilities may be formally certified or self-certified to UL-1741 Supplement SA using the applicable utility Source Requirements Document.

The inverter requirements are intended to be consistent with ANSI/IEEE 1547-2003 and 1547a Standard for Interconnecting Distributed Resources with Electric Power Systems (IEEE 1547 including amendment 1547a). In the event of conflict between this Rule, and IEEE 1547-2003, this Rule shall take precedence. Exceptions are taken to IEEE 1547 Clauses 4.1.4.2 Distribution Secondary Spot Networks and Clauses 4.1.8.1 or 5.1.3.1, which address Protection from Electromagnetic Interference.

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<sup>8</sup> Interconnection approval is defined as, the Companies providing written conditional interconnection approval for the subject project, and it may be installed. Before a project receives an executed interconnection agreement, which is different than interconnection approval, the customer provides all outstanding documentation (such as, but not limited to: closed building permit(s), signature pages, stamped and signed drawings, voltage / frequency settings, etc.) and, if applicable, notifies the Hawaiian Electric Companies that the project is ready for inspection.

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### Prevention Of Interference

Customer-Generator shall not operate Advanced Inverters that superimpose a voltage or current upon the utility's Distribution or Transmission System that interferes with utility operations, service to utility Customers, or communication facilities. If such interference occurs, Customer-Generator must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by utility. If Customer-Generator does not take corrective action in a timely manner, or continues to operate the facilities causing interference without restriction or limit, utility may, without liability, disconnect Customer-Generator's facilities from the utility's Distribution or Transmission System, in accordance with Section 4.b of this Rule. To eliminate undesirable interference caused by its operation, each Advanced Inverter shall meet the following criteria:

- a. Disconnection of Generating Facility for Utility Reasons: See Section 4.a.
- b. Personnel and System Safety: See Section 4.b.
- c. Synchronization: See Section 4.c.
- d. Voltage Regulation: As specified in the sections on volt-var and volt-watt below, the Advanced Inverter shall actively regulate the voltage at the Point of Interconnection while in parallel with the utility's Distribution System. The Advanced Inverter shall not cause the service voltage at other customers to go outside the requirements of ANSI C84.1-2016, Range A (IEEE 1547-4.1.1).
- e. Unintended Islanding: See Section 4.e.
- f. Disconnection for Faults: See Section 4.f.

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- g. Voltage Disturbances: The voltage ranges in Table 4A-1 define protective trip limits for the Protective Function and are not intended to define or imply a voltage regulation function. Generating Facilities shall Cease to Energize utility Distribution System within the prescribed trip time whenever the voltage at the Point of Interconnection deviates from the allowable voltage operating range. The Protection Function shall detect and respond to voltage on all phases to which the Generating Facility is connected.
- (i) Advanced Inverters: Advanced Inverters shall be capable of operating within the voltage range(s) as specified in Table 4A-1. . The trip settings at the generator terminals may be selected in a manner that minimizes nuisance tripping in accordance with Table 4A-1 to compensate for voltage drop between the generator terminals and the Point of Interconnection. Voltage may be detected at either the generator terminals or the Point of Interconnection. However, the voltage range at the Point of Interconnection, with the generator on-line, shall stay within +/-5% of nominal under normal operating conditions.
- (ii) Voltage Disturbances: Whenever the utility Distribution System voltage at the Point of Interconnection varies from and remains outside the normal operating high and normal operating low region voltage for the predetermined parameters set forth in Table 4A-1. The Advanced Inverter's Protective Functions shall cause the Advanced Inverter(s) to Cease to Energize the utility Distribution System. Unless provided alternate settings by the Company, all inverter-based Generating Facilities must comply with the standard voltage ride-through and trip settings specified in Table 4A-1:
1. The Advanced Inverter shall stay connected to the utility Transmission or Distribution System while the grid remains within the "Ride-Through Until" voltage-time range and must operate in accordance with the "Operating Mode" specified for each "Operating Region".
  2. In the Continuous Operation region, the Advanced Inverter shall reduce power output as a function of voltage, in accordance with section (iv) Volt-Watt.
  3. Different settings than those specified in Table 4A-1, (iii) Return to Service (Table 4A-2), and (iv) Volt-Watt (Table 4A-3) may be specified by the utility.

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Table 4A-1: Voltage Ride-Through Table

Operating Region	Voltage at Point of Interconnection (% of Nominal Voltage)	Operating Mode	Ride-Through Until (s)	Default Maximum Trip Time (s)
OV2	$V > 120$	Cease to Energize	N/A	0.16 <sup>(1)</sup>
OV1	$120 \geq V > 110$	Mandatory Operation	0.92	1
CO	$110 \geq V > 100$	Continuous Operation (Volt-Watt)	N/A	N/A
CO	$100 > V \geq 88$	Continuous Operation	N/A	N/A
UV1	$88 > V \geq 70$	Mandatory Operation	20	21
UV2	$70 > V \geq 50$	Mandatory Operation	10-20 <sup>3</sup>	11-21 <sup>(2)</sup>
UV3	$50 > V$	Momentary Cessation	N/A	2

<sup>(1)</sup> Must trip time under steady state condition. Inverters will also be required to meet the Company's Transient Overvoltage criterion (TrOV-2). Ride-Through shall not inhibit TrOV-2 requirements.

<sup>(2)</sup> May be adjusted within these ranges at manufacturer's discretion.

(iii) Return to Service: At initial startup or when returning to service or after a power system disturbance that caused an Advanced Inverter to Trip, the Advanced Inverter shall Return to Service in accordance with the utility's Source Requirements Document (Enter Service). The default values for the Return to Service function are indicated in Table 4A-2.

Table 4A-2: Return to Service Settings

Return to Service	Default Value
Voltage (% of nominal voltage)	88% – 110%
Reconnection time delay	300-600 <sup>(1)</sup>

<sup>(1)</sup> May be adjusted at within this range at manufacturer's discretion

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(iv) Volt-Watt: The Advanced Inverter shall be certified to perform the Volt-Watt function in accordance with the utility's Source Requirements Document. In this mode, the Advanced Inverter shall actively control the active power output as a function of voltage following a Volt-Watt piecewise linear characteristic in accordance with the parameters specified in the Source Requirements Document.

If activated, the Volt-Watt function shall remain active while any of the other voltage and reactive power modes is activated, and operate in  $P_{rated}$  mode.

Note: Non-adjustable time response implementation may be used until the publication by IEEE P1547 of the related volt-active (real) power (Volt-Watt) mode modifications to P1547, or upon mutual agreement between the Customer-Generator and the Company.

Upon mutual agreement between the Customer-Generator and the Company Volt-Watt function may be activated. The Default Values shall be as specified in Table 4A-3.

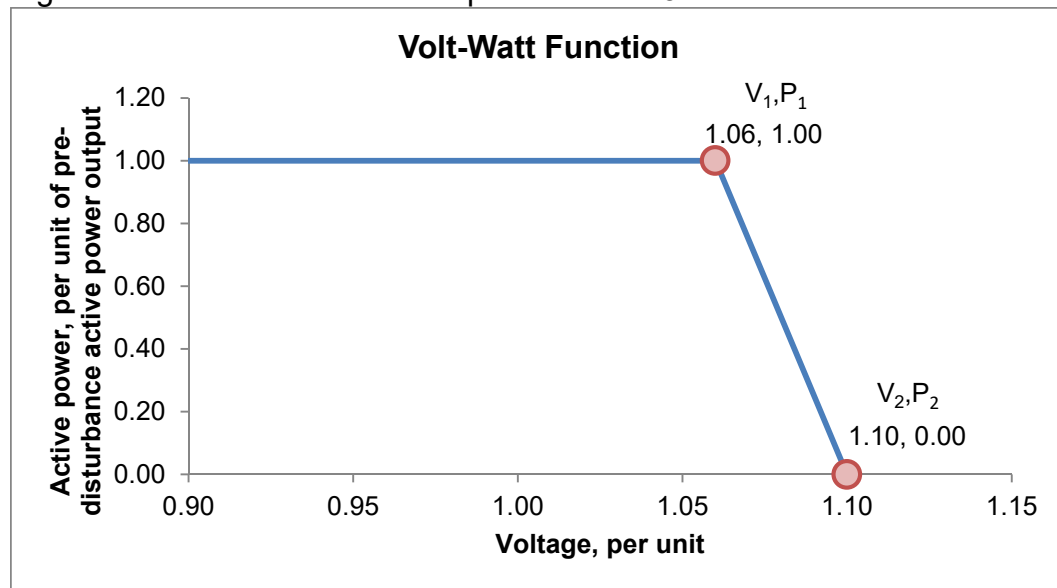
Table 4A-3: Volt-Watt Settings

<b>Parameters<sup>(A)</sup></b>	<b>Default Value</b>
<b>V<sub>1</sub></b>	1.06 of Nominal Voltage ( $V_N$ ), (e.g. 120 Volt)
<b>P<sub>1</sub></b>	$P_{rated}$ is the rated active power output of the Advanced Inverter.
<b>V<sub>2</sub></b>	1.1 of $V_N$
<b>P<sub>2</sub></b>	Advanced Inverter's Minimum Active Power ( $P_{min}$ ) (for Advanced Inverters that can only inject active power, $P_{min}$ should approach 0)
<b>Response Time</b>	10 seconds

<sup>(A)</sup> See the utility Source Requirements Document for parameter definitions.

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Figure 4A-1: Volt-Watt Function per Table 4A-3.



- h. **Frequency Disturbances:** The utility controls system frequency, and the Generating Facility shall operate in synchronism with the utility Distribution or Transmission System. Whenever the utility Distribution or Transmission System frequency at the Point of Interconnection varies from and remains outside normal (nominally 60 Hz) by the predetermined amounts set forth in Table 4A-4 (for Oahu, Maui, Hawaii Island) and Table 4A-5 (for Molokai and Lanai), the Generating Facility's Protective Functions shall Cease to Energize the utility Distribution or Transmission System within the stated maximum trip time. Unless provided alternate settings by the Company, all inverter-based Generating Facilities must comply with the standard frequency ride-through and trip settings specified in Table 4A-4 (for Oahu, Maui, Hawaii Island) and Table 4A-5 (for Molokai and Lanai).
- (i) **Frequency Ride-Through Requirements:** Advanced Inverter based systems shall remain connected to the utility Distribution or Transmission System while the grid is within the frequency-time range indicated in Table 4A-4 (for Oahu, Maui, Hawaii Island) and Table 4A-5 (for Molokai and Lanai), and shall Cease to Energize and Trip from the electric grid during a high or low frequency event that is outside that frequency-time range. The frequency values are shown in Table 4A-4 (for Oahu, Maui, Hawaii Island) and Table 4A-5 (for Molokai and Lanai). These values provide default interconnection system response to abnormal frequency conditions. The inverter shall disconnect by the default clearing times. The Advanced Inverter shall reduce real power output as a function of frequency in accordance with (i) Frequency-Watt (Table 4A-7). Electrical islands and microgrids may need different default frequency settings

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Table 4A-4: Frequency Ride-Through and Trip Settings (Oahu, Maui, Hawai'i Island)

<b>Operating Region</b>	<b>Frequency at Point of Interconnection</b>	<b>Operating Mode</b>	<b>Ride Through Until (s)</b>	<b>Default Maximum Trip Time(s)</b>
<b>OF2</b>	$f > 64.0$	Permissive Operation	None	0.16
<b>OF1</b>	$64.0 \geq f > 63.0$	Mandatory Operation (Freq-watt)	20	21
<b>CO</b>	$63.0 \geq f > 60.0$	Continuous Operation (Freq-watt)	Indefinite	N/A
<b>CO</b>	$60.0 > f \geq 57.0$	Continuous Operation	Indefinite	N/A
<b>UF1</b>	$57.0 > f \geq 56.0$	Mandatory Operation	20	21
<b>UF2</b>	$56.0 > f$	Permissive Operation	None	0.16

Table 4A-5: Frequency Ride-Through and Trip Settings (Molokai, Lanai)

<b>Operating Region</b>	<b>Frequency at Point of Interconnection</b>	<b>Operating Mode</b>	<b>Ride Through Until (s)</b>	<b>Default Maximum Trip Time (s)</b>
<b>OF2</b>	$f > 65.0$	Permissive Operation	None	0.16
<b>OF1</b>	$65.0 \geq f > 63.0$	Mandatory Operation (Freq-watt)	20	21
<b>CO</b>	$63.0 \geq f > 60.0$	Continuous Operation (Freq-watt)	Indefinite	N/A
<b>CO</b>	$60.0 > f \geq 57.0$	Continuous Operation	Indefinite	N/A
<b>UF1</b>	$57.0 > f \geq 50.0$	Mandatory	20	21

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		Operation		
<b>UF2</b>	50.0 > f	Permissiv e Operation	None	0.16

- (i) Frequency-Watt: The Advanced Inverter shall be certified to perform the Frequency-Watt function in accordance with the utility’s Source Requirements Document. In this mode, the Advanced Inverter shall modulate active power when the frequency at the Point of Interconnection is outside the Frequency-Watt deadband in accordance with the parameters specified in the Source Requirements Document.

The power modulation shall be on a percentage basis of the available pre-disturbance ( $P_{pre}$ ) active power existing at the time the frequency is outside the specified deadband.

Note:  $P_{rated}$  mode and non-adjustable time response implementation may be used on an interim basis until the publication by IEEE P1547 of the related Frequency-droop (frequency/power) operation modifications to P1547, or upon mutual agreement between the Customer-Generator and the Company.

Upon mandatory activation of the Frequency-Watt function, the Default Values shall be as indicated in Table 4A-7.

Table 4A-7: Frequency-Watt Settings

Parameter <sup>(A)</sup>	Default Value
dbOF (Hz)	0.036
kOF	0.04
Response time (s)	0.5 <sup>(B)</sup>

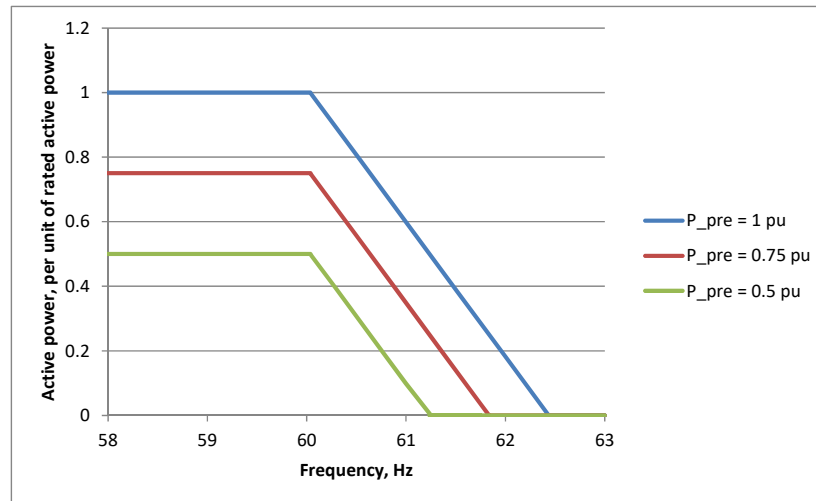
(A) See the utility Source Requirements Document for parameter definitions.

(B) On an interim basis, the Frequency-Watt function may be activated with a Response Time between 0.5 and 3 seconds consistent with the open-loop response times specified in the utility’s Source Requirements Document. A Response Time of 0.5 second is the preferred Default Value.

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Figure 4A-2: Frequency-Watt settings per Table 4A-7.



i. Inadvertent Energization, Operation During Utility System Outage:  
See Section 4.i.

j. Required Delay on Reconnection: See Section 4.j.

k. Loss of Protection: See over existing provision from Section 4.k.

l. Reclosing Coordination: See Section 4.l.

m. Fixed Power Factor: The Advanced Inverter shall be certified to be capable of performing the Fixed Power Factor function in accordance with the utility's Source Requirements Document. In this mode, the Advanced Inverter shall operate at a constant power factor. The target power factor shall be in accordance with the parameters specified in the Source Requirements Document. The power factor settings are allowed to be adjusted locally and/or remotely.

Customer-Generator shall provide adequate reactive power compensation on site to maintain the Advanced Inverter power factor at the default Power Factor setting at rated output (i.e. reactive power priority) or a utility specified power factor in accordance with the following requirements:

(i) Default Power Factor setting: -0.95 absorbing (underexcited).

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- (ii) Aggregate generating facility is greater than 15 kW: Adjustable range 1.0 +/- 0.15 (0.85 absorbing (underexcited) to 0.85 injecting (overexcited)) down to 20% rated power.
  - (iii) Aggregate generating facility is less than or equal to 15 kW: Adjustable range 1.0 +/- 0.10 (0.90 absorbing (underexcited) to 0.90 injecting (overexcited)) down to 20% rated power.
  - (iv) The maximum Response Time to maintain constant power factor shall be 10 seconds or less.
- n. Voltage Flicker: See Section 4.n.
  - o. Harmonics: See Section 4.o.
  - p. Direct Current Injection: See Section 4.p.
  - q. Protection from Electromagnetic Interference (Immunity Protection): See Section 4.q.
  - r. Disconnection of Customer Generating Facilities: See Section 4.r.
  - s. Volt-var Operations: The Advanced Inverter shall be shall be certified to perform the Volt-Var function in accordance with the utility's Source Requirements Document. In this mode, the Advanced Inverter shall actively control its reactive power output as a function of the voltage following a Volt-var piecewise linear characteristic in accordance with the parameters specified in the Source Requirements Document.

If activated, the Volt-var function shall be mutually exclusive mode of reactive power control.

By mutual agreement between the Customer-Generator and the utility, the Advanced Inverter system may operate in larger power factor ranges, including in 4-quadrant operations for storage systems, with the implementation of additional anti-islanding protection as determined by the utility.

The Advanced Inverter shall provide dynamic reactive power compensation (dynamic Volt-var operation) within the following constraints:

- The Advanced Inverter shall not cause the line voltage at the point of interconnection to go outside the requirements of the latest version of ANSI C84.1, Range A.

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- The Advanced Inverter shall be set to prioritize reactive power over active power implementation. The Advanced Inverter shall be able to absorb reactive power in response to an increase in line voltage, and inject reactive power in response to a decrease in line voltage.
- The Advanced Inverter may produce active power up to the kVA rating provided that the Advanced Inverter remains capable at all times to absorb or inject reactive power, to the full extent of the reactive power capability defined in Table 4A-8 and in accordance of the reactive power capability in the utility’s Source Requirements Document. In other words, the Advanced Inverter may need to reduce active power in order to meet the demanded reactive power.
- The maximum reactive power provided to the system shall be as directed by the utility.
- Note: A non-adjustable time response implementation may be used on an interim basis until the publication by IEEE P1547 of the related Voltage-reactive power (Volt-var) modifications to P1547, or upon mutual agreement between the Customer-Generator and the Company.

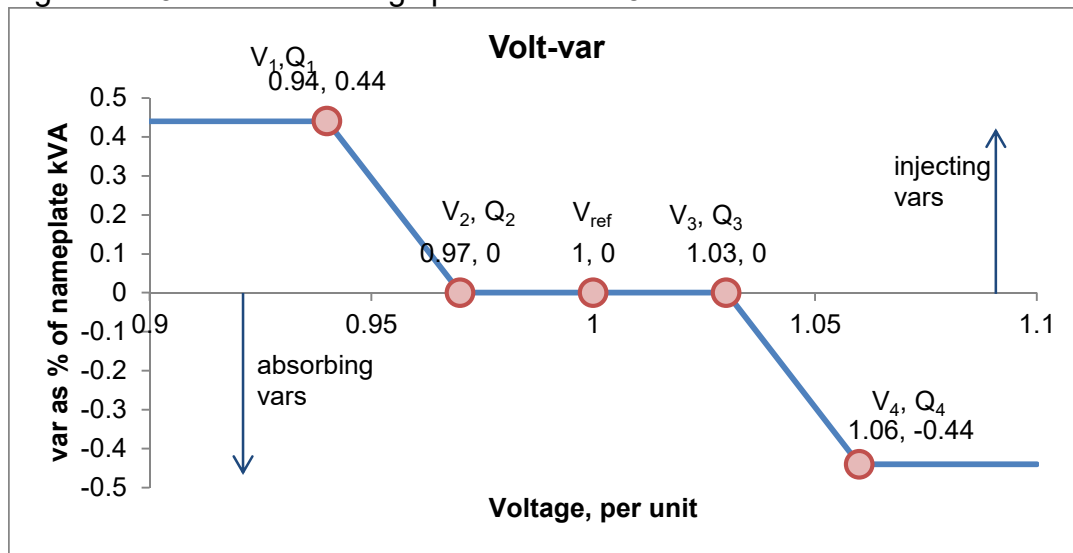
The default values for the Volt-var function are indicated in Table 4A-8.

Table 4A-8: Volt-var Settings

Parameters <sup>(A)</sup>	Default Value
<b>V<sub>Ref</sub></b>	Nominal Voltage (V <sub>N</sub> ) (e.g. 120 volts)
<b>V<sub>2</sub></b>	V <sub>Ref</sub> – 0.03 of V <sub>N</sub>
<b>Q<sub>2</sub></b>	0
<b>V<sub>3</sub></b>	V <sub>Ref</sub> + 0.03 of V <sub>N</sub>
<b>Q<sub>3</sub></b>	0
<b>V<sub>1</sub></b>	V <sub>Ref</sub> – 0.06 of V <sub>N</sub>
<b>Q<sub>1</sub></b>	44% of nameplate apparent power
<b>V<sub>4</sub></b>	V <sub>Ref</sub> + 0.06 of V <sub>N</sub>
<b>Q<sub>4</sub></b>	44% of nameplate apparent power
<b>Response Time</b>	10 seconds

<sup>(A)</sup> See the utility Source Requirements Document for parameter definitions.

Figure 4A-3: Volt-var settings per Table 4A-8.



- t. **Ramp Rate Requirements:** The Advanced Inverter is required to have the following ramp controls for at least the following two conditions. These functions may be established by multiple control functions or by one general ramp rate control function. Ramp rates are contingent upon sufficient energy available from the Advanced Inverter. Normal Ramp Rate and Soft-Start Ramp Rate shall operate in accordance with the applicable utility Source Requirements Document. Default Values are indicated below
- **Normal Ramp Rate:** The default value is 100% of maximum current output per second, with specific settings as mutually agreed by the utility and the Customer-Generator.
  - **Soft-Start Ramp Rate:** Upon starting to inject power into the grid, following a period of inactivity, Trip, Return to Service, or a disconnection, the inverter shall be able to control its rate of increase of power. The default value is 0.33% of maximum current per second, with specific settings as mutually agreed upon by the utility and the Customer-Generator.
- u. **Remote Reconnect/Disconnect:** The Advanced Inverter shall be capable of receiving a remote command directly from the utility, or its agent(s), to connect or disconnect the Advanced Inverter from parallel operation pursuant to Section 4.a and 4.b.
- v. **Remote Configurability:** The Advanced Inverter shall be capable of receiving and implementing remote updates, including but not limited to: advanced inverter

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setting modifications, activation and deactivation of various advanced inverter functions, as required by the utility or its agent(s). The Advanced Inverter shall be capable of reporting current settings.

w. Default Activation States for Functions: Unless otherwise provided by the utility, the default activation status for an Advanced Inverter shall be as follows:

- Anti-islanding – Mandatory Activation
- Transient Overvoltage – Mandatory Activation
- Low/High Voltage Ride-Through – Mandatory Activation
- Low/High Frequency Ride-Through – Mandatory Activation
- Frequency- Watt  $P_{rated}$  – Mandatory Activation
- Volt- Watt  $P_{rated}$  – Activation by Mutual Consent
- Volt-var – Mandatory Activation
- Normal and Soft-Start Ramp Rate – Mandatory Activation
- Fixed power factor – Mandatory Deactivation

These default activation states may be modified by mutual agreement between the utility and Customer-Generator.

## **5. Technology Specific Requirements**

a. Three-Phase Synchronous Generators: The generating facility circuit breakers shall be 3-phase devices with electronic or electromechanical control. The customer shall be responsible for properly synchronizing its generating facility with the utility distribution system by means of either a manual or automatic synchronizing function. Automatic synchronizing is required for all synchronous generators which have an SCCR greater than 5%. For a generating facility whose SCCR exceeds 5%, the customer shall provide protective equipment suitable for detecting loss of synchronism and automatically disconnecting the generating facility from the utility distribution system. Unless otherwise agreed to in writing between the utility and customer, synchronous generators shall automatically regulate power factor, not voltage, while operating in parallel with the utility system.

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- b. Induction Generators: Induction generators may be connected and brought up to synchronous speed (as an induction motor) if it can be demonstrated that the initial voltage drop measured at the Point of Interconnection is within the visible flicker limits as defined by IEEE 1453-2015 (or latest version). The same requirements also apply to induction generation connected at or near synchronous speed because a similar voltage dip is present due to an inrush magnetizing current. The customer shall submit number of starts per specific time period and maximum starting kVA draw data for the utility to verify that the voltage dip due to starting is within the visible flicker limits and does not degrade the normal voltage provided by the utility.

Induction generators do not require separate synchronizing equipment. Starting or rapid load fluctuations on induction generators can adversely impact the utility's system voltage. Corrective step-switched capacitors or other techniques may be necessary if the voltage fluctuations measured at the Point of Interconnection are not within the visible flicker limits as defined by IEEE 1453-2015 (or latest version). These measures can, in turn, cause ferroresonance. If these measures (additional capacitors) are installed on the customer's side of the Point of Interconnection, the utility will review these measures and may require the customer to install additional protective relaying equipment, provided that the utility provides the customer with written notice of the additional equipment required and the reasons for such determination. The Company will determine whether additional equipment is required to protect the Company's system.

- c. Inverter Systems: Inverter interfaced distributed generators that are to be installed in parallel with the utility Distribution System must employ a non-islanding synchronous inverter. The inverter design shall comply with the requirements of IEEE Std 1547 and UL 1741 standards (or latest versions) and be certified to have anti-islanding protection such that the synchronous inverter will automatically disconnect upon a utility system interruption.

Self-commutated inverters of the utility-interactive type shall synchronize to the utility. Inverters capable of stand-alone operation shall not attempt to control the voltage while operating in parallel with the utility Distribution System, except through volt-var and volt-watt control as specified above. Line-commutated, thyristor-based inverters are not recommended and will require Supplemental Review or IRS to determine harmonic and reactive power requirements. All interconnected inverter systems shall comply with the harmonic current limits of IEEE Std 519-2014 and/or IEEE Std 1547 (or latest versions).

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## **6. Protection, Synchronizing, and Control Requirements**

- a. **Protection Requirements**: The generating facility shall, at a minimum, provide adequate protective devices which include over/under voltage trip, over/under frequency trip, reverse power relay (for non-export generating facilities), and a means for automatically disconnecting the generating facility from the utility distribution system whenever a protective device initiates a trip. Based upon the results of the Initial Technical Review and/or Supplemental Review by the Company, additional protective devices may be required. Photovoltaic generating systems are to follow the guidelines set by UL 1741 standard (or latest version). Typical equipment and protective device requirements for large synchronous, induction, and inverter generators are illustrated in Figures 1, 2, and 3 respectively in Exhibit A.
- b. **Suitable Equipment**: All protective devices (described in this document) for generating facilities  $\geq 30\text{kW}$  shall be utility-grade (see Definition for "Utility-Grade Protective Equipment") except for inverter-based generating facilities which shall comply with UL 1741 standard (or latest version) and IEEE 1547 (or latest version). The generating facility shall be responsible for identifying the specific models of their protective devices. All protective devices shall be used in accordance with their intended application.
- c. **Review of Design Drawings**: The following engineering drawings/documents are required for review and approval by the utility prior to construction of the generating facility interconnection. Prior to being submitted to the utility, all drawings/documents shall be approved by a Professional Electrical Engineer registered in the State of Hawaii for generating facilities  $\geq 30\text{kW}$ . That approval shall be indicated by the presence of the Engineer's Professional seal on all drawings and documents.
  - A single-line diagram, relay list, trip scheme and settings of the generating facility, which identifies the Point of Interconnection, circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes.
  - A three-line diagram which shows the Point of Interconnection, potential transformer (PT) and current transformer (CT) ratios, and details of the generating facility configuration, including relays, meters and test switches. (Not required for generating facilities  $< 30\text{kW}$ ).

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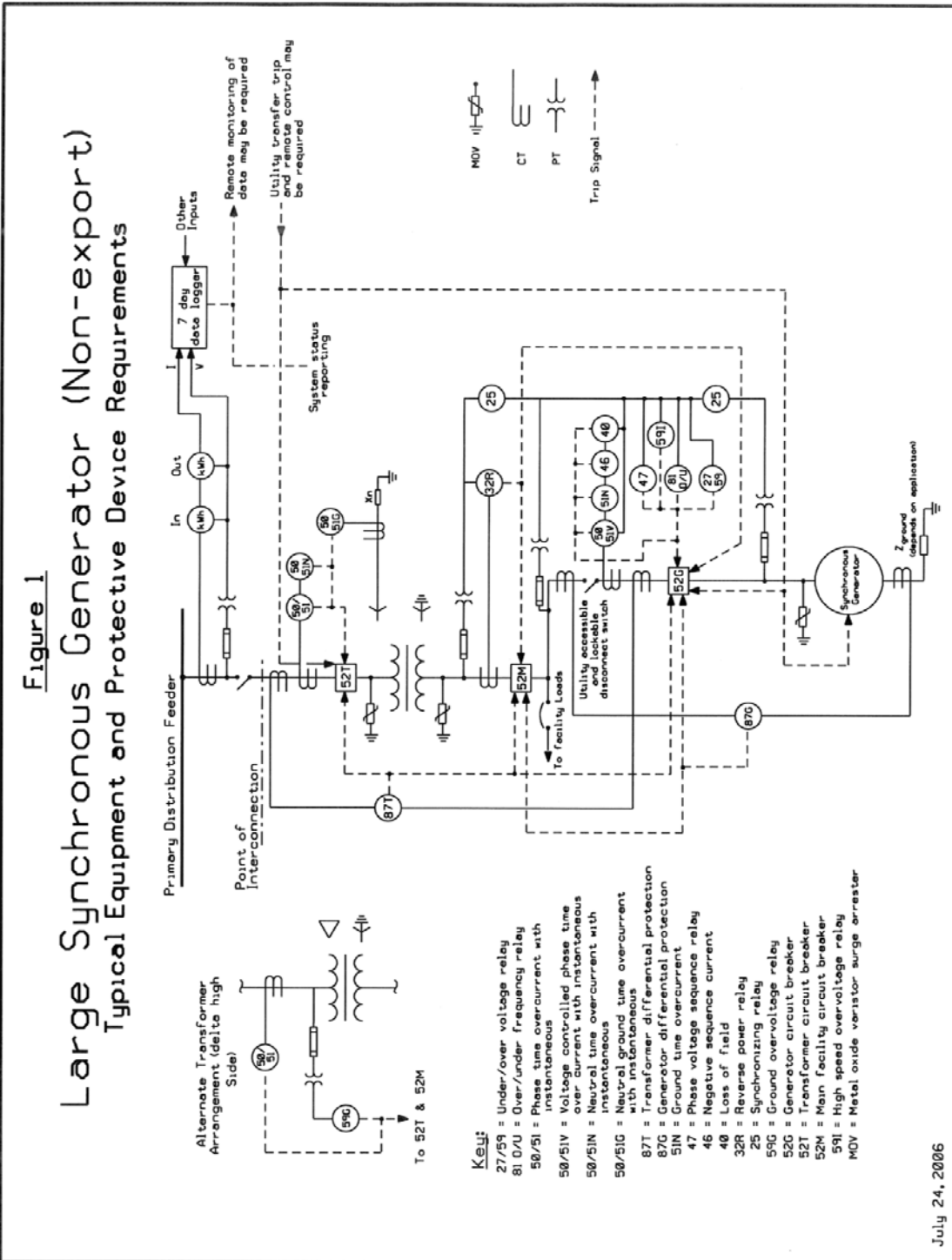
## EXHIBIT A

### Typical Equipment and Protective Device Requirements for Large Synchronous, Induction, and Inverter Generators

HAWAII ELECTRIC LIGHT COMPANY, INC.

Order No. 35266 Dated February 5, 2018, Docket No. 2014-0192  
Transmittal Letter Dated February 20, 2018





HAWAII ELECTRIC LIGHT COMPANY, INC.

## APPENDIX II

### STANDARD INTERCONNECTION AGREEMENT

THIS AGREEMENT ("Agreement") is made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, by and between Hawaii Electric Light Company, Inc., hereinafter called the Company, and \_\_\_\_\_, hereinafter called the Customer.

WHEREAS, the Customer is the recipient of electric service in accordance with the Company's Tariff; and

WHEREAS, the Customer is the owner and operator of a generating facility ("Facility"), as identified in Exhibit A and defined in Section 3 of this Agreement; and

WHEREAS, the Customer desires to interconnect the Facility in parallel with the Company's system upon the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the premises and the respective promises herein, the Company and the Customer hereby agree as follows:

1. Scope Of Agreement: This Agreement relates solely to the conditions under which the Company and the Customer agree that the Facility may be interconnected to and operated in parallel with the Company's system.
2. Parallel Operation: The Facility may interconnect and operate in parallel with the Company's system in accordance with the terms and conditions of this Agreement.
3. Facility:
  - (a) For the purposes of this Agreement, the "Facility" is defined as the equipment and devices, and associated appurtenances, owned by the Customer, which produce electric energy for use by the Customer and are to be interconnected and operated in parallel with the Company's system.
  - (b) The Customer shall furnish, install, operate and maintain, at its cost, the interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) identified in Exhibit B hereto ("Customer Interconnection Facilities").

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- (c) The point of interconnection is shown on the single-line diagram and three-line diagram (provided by the Customer and reviewed by the Company) which are attached to Exhibit B (provided that the three-line diagram is not required if the Facility's capacity is less than 30 kW).
- (d) The Customer agrees to test the Facility, to maintain operating records, and to follow such operating procedures, as may be specified by the Company to protect the Company's system from damages resulting from the parallel operation of the Facility, including such testing, records and operating procedures as more fully described in Exhibit B attached hereto and made a part hereof.
- (e) The Company may inspect the Facility, as more fully described in Exhibit B.

4. Interconnection Facilities Owned by the Company: The Company agrees to furnish, install, operate and maintain such interconnection facilities on its side of the point of interconnection with the Facility as required for parallel operation with the Facility and as more fully described in Exhibit C attached hereto and made a part hereof ("Company Interconnection Facilities"). All such interconnection facilities shall be the property of the Company. Where portions of the Company Interconnection Facilities are located on the Customer's premises, the Customer shall provide, at no expense to the Company, a suitable location for and access to all such equipment. If a 120/240 Volt power source or sources are required, the Customer shall provide these at no expense to the Company.

5. Customer Payments:

- (a) The Customer agrees to pay to the Company a reasonable non-refundable contribution for the Company's investment in the interconnection facilities described in Exhibit C, subject to the terms and conditions included in Exhibit C, and to pay for other reasonable interconnection costs. The interconnection costs will not include the cost of an initial technical screening of the impact of the Facility on the Company's system, but will include the actual cost (or such lesser amount as the Company may specify to facilitate the processing of interconnection requests for similarly situated facilities) of additional technical study for the Facility, if additional technical study is conducted.

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- (b) [FOR FEDERAL GOVERNMENT ENTITIES (the "FGE") - Replace paragraph (a) with the following:]

The FGE agrees to pay to the Company a reasonable non-refundable contribution for the Company's investment in the interconnection facilities described in Exhibit C, and to pay for other reasonable interconnection costs by means of a modification to the existing electric service contract or other contracting vehicle. The contract modification shall be executed prior to effectuating this Agreement.

6. Commencement of Producing Energy in Parallel: After this Agreement is executed, and the Customer Interconnection Facilities and the Company Interconnection Facilities are completed, the Facility may be operated in parallel with the Company's system, provided that the Customer has satisfied the conditions in Section 3 of Exhibit B of this Agreement.
7. Incidental Deliveries of Energy: The Company shall have no duty under this Agreement to account for, pay for, deliver, or return in kind any energy produced by the Facility and delivered into the Company's system. The meter for service received from the Company shall be ratcheted to prevent reverse registration.
8. Disconnection of Facility for Utility Reasons:
  - (a) Upon providing reasonable notice (generally not to be less than ten (10) business days for scheduled work), the Company may require the Customer to temporarily disconnect the Facility from the Company's system when necessary for the Company to construct, install, maintain, repair, replace, remove, investigate, test or inspect any of its equipment or other customers' equipment or any part of its system. If the Company determines that such disconnection is necessary because of an unexpected system emergency, forced outage, operating conditions on its systems, or compliance with good engineering practices as determined by the Company, the Company will immediately attempt to notify the Customer or the Customer's designated representatives in person, by telephone, by electronic mail, or by facsimile, of the need to disconnect the Facility. Unless the emergency condition requires immediate disconnection as determined by the Company, the Company shall allow sufficient time for the Customer to manually disconnect the Facility.

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- (b) The Facility shall not energize a de-energized utility line under any circumstances, but may operate its Facility isolated from the utility system with an open tie point in accordance with Section 4.i of Appendix I to HELCO Tariff Rule 14H.
  - (c) Following the completion of work and/or rectification of the emergency conditions by the Company, the Company shall reset the Customer's service breaker, if open, as soon as practicable and shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the Company and the Customer, written documentation of the occurrence and nature of the Company's work and/or emergency condition, and of the disconnection of the Facility.
  - (d) The Company shall take reasonable steps to minimize the number and duration of such disconnections.
  - (e) The disconnection of the Facility under this Section 8 shall not be subject to standby service charges under the Company's Schedule SS Standby Service tariff.
  - (f) The Company may disconnect the Customer from the Company's system for failure by the Customer to disconnect the Facility under this Section 8, until such time that the Company's work or the system condition has been corrected and the normal system condition has been restored.
9. Personnel and System Safety: Notwithstanding any other provisions of this Agreement, the Company may disconnect the Facility from the Company's system, without prior notice to the Customer, (a) to eliminate conditions that constitute a potential hazard to the Company's personnel or the general public; (b) if pre-emergency or emergency conditions exist on the Company system; (c) if a hazardous condition relating to the Facility is observed by the Company's inspection; (d) if the Facility interferes with the Company's equipment or equipment belonging to other customers of the Company (including non-utility generating equipment); or (e) if the Customer of the Facility has tampered with any protective device. The Facility shall remain disconnected until such time as the Company is satisfied that the endangering condition(s) as listed above has been corrected, and the Company shall not be obligated to allow parallel operation of the Facility during such period. If the Company disconnects the Facility under this Section 9, it shall as soon as practicable

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notify the Customer in person, by telephone, by electronic mail, or by facsimile and provide the reason(s) why the Facility was disconnected from the Company's system. Following the rectification of the endangering conditions, the Company shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the Company and the Customer, written documentation of the occurrence of the endangering conditions, and of the disconnection of the Facility. The disconnection of a customer's generating facility shall not be subject to standby service charges provided that the disconnection was caused by the utility or the utility's equipment. The procedure for determining the applicability of standby charges to a disconnection event shall be specified in the Company's Schedule SS Standby Service tariff.

10. Transmission Service Not Provided with Interconnection: Interconnection with the Company's system under this Agreement does not provide the Customer any rights to utilize the Company's system for the transmission or distribution of electric power.
11. Prevention of Interference: The Customer shall not operate equipment that superimposes a voltage or current upon the Company's system that interferes with the Company's operations, service to the Company's customers, or the Company's communication facilities. Such interference shall include, but not be limited to, overcurrent, voltage imbalance, and abnormal waveforms. If such interference occurs, the Customer must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by the Company. If the Customer does not take timely corrective action, or continues to operate the equipment causing interference without restriction or limit, the Company may, without liability, disconnect the Customer's equipment from the Company's system.
12. Location of Metering: Where Company-owned metering is located on the Customer's premises, the Customer shall provide, at no expense to the Company, a suitable location for and access to all such metering.
13. Design Reviews and Inspections: The Company's review and authorization to allow the Facility to interconnect and operate in parallel with the Company's system shall not be construed as confirming or endorsing the Facility's design or as warranting the Facility's safety, durability or reliability. The Company shall not, by reason of such review or lack of review, be

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responsible for the equipment, including but not limited to, the safety, strength, adequacy, durability, reliability, performance, or capacity of such equipment.

14. Permits, Approvals, and Licenses: The Customer shall obtain, at its expense, any and all authorizations, approvals, permits, and licenses required for the construction and operation of the Facility and the interconnection with the Company's system, including but not limited to environmental permits, building permits, rights-of-way, or easements.
15. Term: This Agreement shall become effective when executed by the Customer and the Company and shall continue in effect until terminated.
16. Termination: This Agreement may be terminated as follows: (a) the Customer may terminate this Agreement at any time, by giving the Company at least sixty (60) days written notice, provided that the Facility is disconnected from the Company's system and no longer operating in parallel with the Company's system at the time this Agreement is terminated; (b) the Company may terminate this Agreement upon failure by the Customer to generate energy from the Facility in parallel with the Company's system within twelve (12) months after completion of the interconnection; (c) either party may terminate this Agreement by giving the other party at least thirty (30) days prior written notice that the other party is in default of any of the material terms and conditions of the Agreement, provided that the notice specifies the basis for the termination and there is a reasonable opportunity to cure the default; (d) the Company may terminate this Agreement if the Facility is removed from permanent service; (e) the Company and the Customer may terminate this Agreement at any time by mutual agreement provided that the agreement is in writing and signed by both parties; or (f) the Company may terminate this Agreement by giving the Customer at least sixty (60) days prior written notice in the event that there is a material change in an applicable statute, rule or tariff.
17. Disconnection and Survival of Obligations: Upon termination of this Agreement the Facility shall be disconnected from the Company's system. The termination of this Agreement shall not relieve the parties of their liabilities and obligations, owed or continuing at the time of the termination.

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18. Indemnification:

- (a) The Customer shall indemnify, defend and hold harmless the Company and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Company's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Customer (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Facility and/or the Customer Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Company or its officers, directors, agents or employees.
- (b) The Company shall indemnify, defend and hold harmless the Customer, and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Customer's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Company (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Company Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Customer or its officers, directors, agents or employees.
- (c) Nothing in this Agreement shall create any duty to, any standard of care with reference to, or any liability to any person or entity not a party to it.
- (d) **[FOR CUSTOMER THAT IS AN AGENCY OF THE STATE OF HAWAII (the "State")]**  
The State shall be responsible for damages or injury caused by the State's agents, officers, and employees in the course of their employment to the extent that the State's liability for such damage or injury has been determined by a court or

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otherwise agreed to by the State. The State shall pay for such damage and injury to the extent permitted by law. The State shall use reasonable good faith efforts to pursue any approvals from the Legislature and the Governor that may be required to obtain the funding necessary to enable the State to perform its obligations or cover its liabilities hereunder. The State shall not request Company to indemnify the State for, or hold the State harmless from, any claims for such damages or injury.

Company shall be responsible for damages or injury caused by Company, Company's agents, officers, and employees in the course of their employment to the extent that Company's liability for such damage or injury has been determined by a court or otherwise agreed to by Company, and Company shall pay for such damage and injury to the extent permitted by law. Company shall not request the State to indemnify Company for, or hold Company harmless from, any claims for such damages or injury.

- (e) [FOR FEDERAL GOVERNMENT ENTITIES (the "FGE") - delete paragraphs (a) through (d) and replace with the following:]

Neither party hereto shall be responsible for loss or damage to the property of the other party or property of others, or for death or for personal injuries to the other party's officers, agents, servants, or employees, or to other persons, arising from or related to (a) the Company's initiation of a service interruption under this contract and /or (b) the FGE's electric service being disconnected or reconnected by the Company and/or FGE pursuant to this contract and/or (c) the parallel operation of the systems of the parties hereto or incident to the use, operation, or maintenance with respect to the furnishing of service hereunder, except for such loss, damage, death or injuries caused by the FGE for which it may be liable under the Federal Tort Claims Act and in the case of the Company as may be caused by the negligence, wrongful act or omission of the Company, its agents, servants or employees; nor, except for matters for which it may be liable under the Federal Tort Claims Act, shall the FGE be responsible in any way for any damage or loss of profit suffered by the Company arising from or incident to such use, operation or maintenance.

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19. Insurance:

- (a) The Customer shall, at its own expense and during the term of the Agreement and any other time that the Facility is interconnected with the Company's system, either (a) maintain in effect with a responsible insurance company authorized to do insurance business in Hawaii, insurance that will adequately protect the Customer and the Company with respect to risks arising under this Agreement, including the Facility's interconnection with the Company's system, provided the forms, amounts and conditions of such insurance coverage shall be as specified in Exhibit D hereto, or (b) self insure, in lieu of obtaining insurance coverage from an insurance company, provided the terms of such self insurance shall be as specified in Exhibit D hereto. Customer is responsible for determining its own level and form of insurance. The Customer's indemnity and other obligations shall not be limited by this provision. Any deductible shall be the responsibility of the Customer.

In the event Customer obtains insurance from an insurance company, proof of such insurance, including certificates of insurance showing the form and amounts of coverage, must be provided to the Company prior to any parallel interconnection. In the event Customer self insures, documentation describing the Customer's means and capability of self-insuring must be provided to the Company prior to any parallel interconnection.

- (b) [FOR FEDERAL GOVERNMENT ENTITIES (the "FGE") - delete paragraph (a) and insert the following:]

The Interconnection Customer is considered to be self-insured for the purpose of this agreement and shall not be required to maintain any separate policy of insurance under this section of the agreement. Notwithstanding the above, this shall in no event waive or otherwise release or limit the Interconnection Customer's liabilities undertaken pursuant to this agreement. The Company agrees to maintain general liability insurance or self-insurance consistent with the Company's commercial practice. Such insurance or self-insurance shall not exclude coverage for the Company's liabilities undertaken pursuant to this agreement. The parties to this agreement further agree to notify each other whenever an accident or incident occurs resulting in any injuries or damages that are included within the scope of

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coverage of such insurance, whether or not such coverage is sought.

20. Force Majeure: For purposes of this Agreement, "Force Majeure Event" means any event: (a) that is beyond the reasonable control of the affected party; and (b) that the affected party is unable to prevent or provide against by exercising reasonable diligence, including the following events or circumstances, but only to the extent they satisfy the preceding requirements: acts of war, public disorder, insurrection, or rebellion; floods, hurricanes, earthquakes, lightning, storms, and other natural calamities; explosions or fires; strikes, work stoppages, or labor disputes; embargoes; and sabotage. If a Force Majeure Event prevents a party from fulfilling any obligations under this Agreement, such party will promptly notify the other party in writing, and will keep the other party informed on a continuing basis of the scope and duration of the Force Majeure Event. The affected party will specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the affected party is taking to mitigate the effects of the event on its performance. The affected party will be entitled to suspend or modify its performance of obligations under this Agreement, other than the obligation to make payments then due or becoming due under this Agreement, but only to the extent that the effect of the Force Majeure Event cannot be mitigated by the use of reasonable efforts. The affected party will use reasonable efforts to resume its performance as soon as possible.
21. Warranties: The Company and the Customer each represents and warrants respectively that:
- (a) It has all necessary right, power and authority to execute, deliver and perform this Agreement.
  - (b) The execution, delivery and performance of this Agreement by it will not result in a violation of any law or regulation of any governmental authority, or conflict with, or result in a breach of, or cause a default under, any agreement or instrument to which such party is also a party or by which it is bound.
22. Good Engineering Practice:
- (a) Each party agrees to install, operate and maintain its respective equipment and facilities and to perform all obligations required to be performed by such party under this

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Agreement in accordance with good engineering practice in the electric industry and with applicable laws, rules, orders and tariffs.

- (b) Wherever in this Agreement and the attached Exhibits the Company has the right to give specifications, determinations or approvals, such specifications, determinations or approvals shall be given in accordance with the Company's standard practices, policies and procedures, which may include the Company's Electric Service Installation Manual, the Company's Engineering Standard Practice Manual and IEEE Guides and Standards for Protective Relaying Systems.

23. Miscellaneous:

- (a) Amendments. Any amendment or modification of this Agreement or any part hereof shall not be valid unless in writing and signed by the parties. Any waiver hereunder shall not be valid unless in writing and signed by the party against whom waiver is asserted.
- (b) Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors, legal representatives, and permitted assigns.
- (c) Notices. Any written notice provided hereunder shall be delivered personally or sent by registered or certified first class mail, with postage prepaid, to the other party at the following addresses:

Company: \_\_\_\_\_

\_\_\_\_\_

Attn: \_\_\_\_\_

\_\_\_\_\_

Customer: The mailing address listed in Exhibit A attached hereto.

Notice sent by mail shall be deemed to have been given on the date of actual delivery or at the expiration of the fifth day after the date of mailing, whichever is earlier. Any party hereto may change its address for written notice by giving written notice of such change to the other party hereto.

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- (d) Effect of Section and Exhibit Headings. The headings or titles of the several sections and exhibits hereof are for convenience of reference and shall not affect the construction or interpretation of any provision of this Agreement.
- (e) Relationship of Parties. Nothing in this Agreement shall be deemed to constitute any party hereto as partner, agent or representative of the other party or to create any fiduciary relationship between the parties.
- (f) Entire Agreement. This Agreement constitutes the entire understanding and agreement between the Company and the Customer.
- (g) Limitations. Nothing in this Agreement shall limit the Company's ability to exercise its rights or expand or diminish its liability with respect to the provision of electrical service pursuant to the Company's Tariff as filed with the State of Hawaii Public Utilities Commission ("PUC"), or the PUC's Standards for Electric Utility Service in the State of Hawaii, which currently are included in the PUC's General Order Number 7, as either may be amended from time to time.
- (h) Governing Law and Regulatory Authority. This Agreement was executed in the State of Hawaii and must in all respects be governed by, interpreted, construed, and enforced in accordance with the laws thereof. This Agreement is subject to, and the parties' obligations hereunder include, operating in full compliance with all valid, applicable federal, state, and local laws or ordinances, and all applicable rules, regulations, orders of, and tariffs approved by, duly constituted regulatory authorities having jurisdiction.
- (i) Multiple Counterparts. This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

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Superseding REVISED SHEET NO. 38C-13  
Effective May 27, 2010

REVISED SHEET NO. 38C-13  
Effective December 3, 2011

IN WITNESS WHEREOF, the Company and the Customer have executed  
this Agreement as of the day and year first above written.

By \_\_\_\_\_  
Name  
Title  
Date

By \_\_\_\_\_  
Name  
Title  
Date

By \_\_\_\_\_  
Name  
Title  
Date

"Company"

"Customer"

HAWAII ELECTRIC LIGHT COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.

**EXHIBIT A**

**Application for Interconnecting a UL1741 Certified Inverter-Based Small  
Generating Facility No Larger than 10kW**

This Application is considered complete when it provides all applicable and correct information required below. Additional information to evaluate the Application may be required.

Customer

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Daytime):  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

Electric Service Company and Account No.:

Facility Location (if different from above): \_\_\_\_\_

Facility Location Tax Map Key number: \_\_\_\_\_

Owner of the Generating Facility (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Daytime):  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

Operator (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Daytime):  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

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**Generating Facility Information**

Inverter Manufacturer(s): \_\_\_\_\_ Model(s) \_\_\_\_\_

Nameplate Rating: \_\_\_\_\_ (kW) \_\_\_\_\_ (kVA) \_\_\_\_\_ (AC Volts) (CEC-CSI)<sup>1</sup>

Single Phase \_\_\_\_\_ Three Phase \_\_\_\_\_

System Design Capacity: \_\_\_\_\_ (kW) \_\_\_\_\_ (kVA) \_\_\_\_\_ (AC Volts) (CEC-CSI)

Prime Mover: Photovoltaic  Reciprocating Engine  Fuel Cell

Turbine  Other \_\_\_\_\_

Energy Source: Solar  Wind  Hydro  Diesel  Natural Gas

Fuel Oil  Other (describe) \_\_\_\_\_

Is the equipment UL1741 Listed? Yes \_\_\_\_\_ No \_\_\_\_\_

If Yes, attach manufacturer's cut-sheet showing UL1741 listing

Is the system self excited with the potential to island (i.e. will the equipment package include an onsite storage system)? Yes \_\_\_\_\_ No \_\_\_\_\_

Estimated Installation Date: \_\_\_\_\_ Estimated In-Service Date: \_\_\_\_\_

The 10 kW Inverter Process is available only for inverter-based Generating Facilities no larger than 10 kW that meet the codes, standards, and certification requirements of NEC, UL 1741, IEEE, County Electrical Building Codes, and the Company's interconnection requirements in effect at the time of signing this application.

List components of the Small Generating Facility equipment package that are currently certified:

Equipment Type	Certifying Entity (e.g. UL)
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

UF Trip Setting: \_\_\_\_\_ UF Time Delay (Secs) \_\_\_\_\_

**Installation Details**

Installing Electrical Contractor: \_\_\_\_\_ Firm: \_\_\_\_\_ License No.: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

<sup>1</sup> CEC-CSI means the California Energy Commission's ratings under the California Solar Initiative program.  
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City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone: Area Code: \_\_\_\_\_ Number: \_\_\_\_\_

Installation Date: \_\_\_\_\_ Interconnection Date: \_\_\_\_\_

Supply certification that the generating system has been installed and inspected in compliance with the local Building/Electrical code of the county of \_\_\_\_\_ .

Signed (Inspector): \_\_\_\_\_ Date: \_\_\_\_\_  
(In lieu of signature of Inspector, a copy of the final inspection certificate may be attached)

**Generator/Equipment Certification**

Generating systems that utilize inverter technology must be compliant with *Institute of Electrical and Electronics Engineers IEEE Std 1547* and *Underwriters Laboratories UL 1741* in effect at the time this Agreement is executed. Generating systems that use a rotating machine must be compliant with applicable National Electrical Code, Underwriters Laboratories, and Institute of Electrical and Electronics Engineers standards and rules and orders of the Hawaii Public Utilities Commission in effect at the time this Agreement is executed. **By signing below, the Applicant certifies that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance.**

Signed (Customer): \_\_\_\_\_ Date: \_\_\_\_\_

**Insurance**

Insurance Carrier: \_\_\_\_\_

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**INTERCONNECTION APPLICATION FOR ALL BUT UL1741 CERTIFIED  
INVERTER BASED SYSTEMS LESS THAN 10 KW**

In addition to the information provided below, a complete Interconnection Application includes:

1) a single-line diagram, 2) relay list, trip scheme and settings of the Generating Facility, 3) Generating Facility Equipment List, and 4) three-line diagram (if needed), which identify the circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes, shall, after having obtained prior consent from the Company, be attached to and made a part of the interconnection agreement that is signed between the Customer and the Company at the end of the interconnection process.

The single-line diagram shall include pertinent information regarding operation, protection, synchronizing, control, monitoring and alarm requirements. The single-line diagram and three-line diagram shall expressly identify the point of interconnection of the Generating Facility to the Company's Distribution System. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Generating Facility in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Generating Facility's configuration, including relays, meters, and test switches.

**Section 1, Applicant Information**

Customer

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone (Daytime): \_\_\_\_\_ (Evening) \_\_\_\_\_ Area \_\_\_\_\_  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ Code \_\_\_\_\_ Number \_\_\_\_\_

E-mail: \_\_\_\_\_ Account Number: \_\_\_\_\_

Facility Location (if different from above): \_\_\_\_\_

Facility Location Tax Map Key number: \_\_\_\_\_

Owner (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

E-mail: \_\_\_\_\_

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Telephone (Daytime): Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area \_\_\_\_\_ Number \_\_\_\_\_  
Code \_\_\_\_\_

Operator (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

E-mail: \_\_\_\_\_

Telephone (Daytime): Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area \_\_\_\_\_ Number \_\_\_\_\_  
Code \_\_\_\_\_

## **Section 2, Generator Qualifications**

Is the generator a Qualifying Facility as defined under Subpart B, Section 201 of the Federal Energy Regulatory Commission's regulations per the Public Utility Regulatory Policies Act of 1978, or the PUC's Standards for Small Power Production and Cogeneration (Hawaii Administrative Rules Title 6, Chapter 74)?

Yes  No

Is Generator powered from a Nonfossil Fuel Source?

Yes  No

Type of Qualifying Facility or Nonfossil Fuel Source (if applicable):  Solar  Wind  Hydro

Biomass  Geothermal

Other generator energy source:  Diesel  Other Fuel Oil  Other:

PV Array DC Rated Output: \_\_\_\_\_ kW PV Array AC Rated Output: \_\_\_\_\_ kW  
(CEC-CSI)<sup>2</sup>

Maximum Site Load without Generation: \_\_\_\_\_ kW Maximum Generator Capability: \_\_\_\_\_ kW

Minimum Site Load without Generation: \_\_\_\_\_ kW Maximum Export: \_\_\_\_\_ kW

<sup>2</sup> CEC-CSI means the California Energy Commission's ratings under the California Solar Initiative program.

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**Section 3, Generator Technical Information**

Type of Generator:  Synchronous  Induction  Inverter-Based Generating Facility

Generator (or solar collector) Manufacturer, Model Name & Number: \_\_\_\_\_  
(A copy of Generator Nameplate and Manufacturer's Specification Sheet may be substituted)

\_\_\_\_\_ Nameplate Rating in kW: \_\_\_\_\_  
Operating Power Factor: \_\_\_\_\_

Inverter Manufacturer, Model Name & Number (if used): \_\_\_\_\_  
(A copy of Inverter Nameplate and Manufacturer's Specification Sheet may be substituted)

\_\_\_\_\_ Rating in kW: \_\_\_\_\_  
Operating Power Factor: \_\_\_\_\_

Number of Starts Per Day: \_\_\_\_\_ Maximum Starting kVA: \_\_\_\_\_

UF Trip Setting: \_\_\_\_\_ UF Time Delay (Secs) \_\_\_\_\_

Generator Grounding Method:

- |  |   |
|--|---|
| <input type="checkbox"/> Effectively Grounded    | <input type="checkbox"/> Resonant Grounded        |
| <input type="checkbox"/> Low-Inductance Grounded | <input type="checkbox"/> High-Resistance Grounded |
| <input type="checkbox"/> Low-Resistance Grounded | <input type="checkbox"/> Ungrounded               |

Generator Characteristic Data (for rotating machines):  
(Not needed if Generator Nameplate and Manufacturer's Specification Sheet are provided)

Direct Axis Synchronous Reactance,  $X_d$ : \_\_\_\_\_ P.U.    Negative Sequence Reactance: \_\_\_\_\_ P.U.  
Direct Axis Transient Reactance,  $X'_d$ : \_\_\_\_\_ P.U.    Zero Sequence Reactance: \_\_\_\_\_ P.U.  
Direct Axis Subtransient Reactance,  $X''_d$ : \_\_\_\_\_ P.U.    KVA Base: \_\_\_\_\_  
Inertia Constant, H: \_\_\_\_\_ P.U.  
Excitation Response Ratio: \_\_\_\_\_  
Direct Axis Open-Circuit Transient Time Constant,  $T'_{do}$ : \_\_\_\_\_ Seconds  
Direct Axis Open-Circuit Subtransient Time Constant,  $T''_{do}$ : \_\_\_\_\_ Seconds  
Fault Current Contribution of Generator: \_\_\_\_\_ Amps

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**Section 4, Interconnecting Equipment Technical Data**

Will an interposing transformer be used between the generator and the point of interconnection?  Yes  No

Transformer Data (if applicable, for Customer Owned Transformer):  
(A copy of transformer Nameplate and Manufacturer's Test Report may be substituted)

Size: \_\_\_\_\_ KVA. Transformer Primary: \_\_\_\_\_ Volts  Delta  Wye  Wye Grounded

Transformer Secondary: \_\_\_\_\_ Volts  Delta  Wye  Wye Grounded

Transformer Impedance: \_\_\_\_\_ % on \_\_\_\_\_ KVA Base

Transformer Fuse Data (if applicable, for Customer Owned Fuse):  
(Attach copy of fuse manufacturer's Minimum Melt & Total Clearing Time-Current Curves)

At  Primary Voltage  Secondary Voltage

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Size: \_\_\_\_\_ Speed: \_\_\_\_\_

Transformer Protection (if not fuse):

Please describe: \_\_\_\_\_

Interconnecting Circuit Breaker (if applicable):  
(A copy of circuit breaker's Nameplate and Specification Sheet may be substituted)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Continuous Load Rating: \_\_\_\_\_ Interrupting Rating: \_\_\_\_\_ Trip Speed: \_\_\_\_\_  
(Amps) (Amps) (Cycles)

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Circuit Breaker Protective Relays (if applicable):

(Enclose copy of any proposed Time-Overcurrent Coordination Curves)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_

Current Transformer Data (if applicable):

(Enclose copy of Manufacturer's Excitation & Ratio Correction Curves)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_ /5  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_ /5

Generator Disconnect Switch:

A generator disconnect device (isolation device) must be installed with features as described in the "HECO, HELCO, MECO Distributed Generating Facility Interconnection Standards, Technical Requirements" as set forth in Rule No. 14 (Paragraph H.1) of the Company's tariff, and which is accessible to Company.

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Catalog No.: \_\_\_\_\_ Rated Volts: \_\_\_\_\_ Rated Amps: \_\_\_\_\_  
Single or 3 Phase: \_\_\_\_\_ Mounting Location: \_\_\_\_\_

**Section 5, General Technical Information**

Enclose copy of site single-line diagram showing configuration and interconnection of all equipment, current and potential circuits and protection and control schemes.

Is Single-Line Diagram Enclosed? Yes

Enclose copy of site relay list and trip scheme, which shall include all protection, synchronizing and auxiliary relays that are required to operate the Facility in a safe and reliable manner.

Are Relay List and Trip Scheme Enclosed? Yes

Enclose copy of site three-line diagram (if the Facility's capacity is greater than or equal to 30 kW) showing potential transformer and current transformer ratios, and details of the Facility's configuration, including relays, meters, and test switches.

Is Three-Line Diagram Enclosed? Yes

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**Section 6, Installation Details**

Installing Electrical Contractor: \_\_\_\_\_ Firm: \_\_\_\_\_ License No.: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone: Area Code: \_\_\_\_\_ Number: \_\_\_\_\_

Installation Date: \_\_\_\_\_ Interconnection Date: \_\_\_\_\_

Supply certification that the generating system has been installed and inspected in compliance with the local Building/Electrical code of the county of \_\_\_\_\_ .

Signed (Inspector): \_\_\_\_\_ Date: \_\_\_\_\_  
(In lieu of signature of Inspector, a copy of the final inspection certificate may be attached)

**Section 7, Generator/Equipment Certification**

Generating systems that utilize inverter technology must be compliant with *Institute of Electrical and Electronics Engineers IEEE Std 1547* and *Underwriters Laboratories UL 1741* in effect at the time this Agreement is executed. Generating systems that use a rotating machine must be compliant with applicable National Electrical Code, Underwriters Laboratories, and Institute of Electrical and Electronics Engineers standards and rules and orders of the Hawaii Public Utilities Commission in effect at the time this Agreement is executed. **By signing below, the Applicant certifies that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance.**

Signed (Customer): \_\_\_\_\_ Date: \_\_\_\_\_

**Section 8, Insurance**

Insurance Carrier: \_\_\_\_\_

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EXHIBIT B

FACILITY OWNED BY THE CUSTOMER

1. Facility

- a. Compliance with laws and standards. The Facility, Facility design, and Facility design drawings shall meet all applicable national, state, and local laws, rules, regulations, orders, construction and safety codes, and shall satisfy the Company's Distributed Generating Facility Interconnection Standards, Technical Requirements ("Interconnection Standards"), as set forth in Rule No. 14, Paragraph H.1 of the Company's tariff.
- b. Avoidance of adverse system conditions. The Facility shall be designed, installed, operated and maintained so as to prevent or protect against adverse conditions on the Company's system that can cause electric service degradation, equipment damage, or harm to persons, such as:
  - (i) Unintended islanding.
  - (ii) Inadvertent and unwanted re-energization of a Company dead line or bus.
  - (iii) Interconnection while out of synchronization.
  - (iv) Overcurrent.
  - (v) Voltage imbalance.
  - (vi) Ground faults.
  - (vii) Generated alternating current frequency outside of permitted safe limits.
  - (viii) Voltage outside permitted limits.
  - (ix) Poor power factor or reactive power outside permitted limits.
  - (x) Abnormal waveforms.

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- c. Specification of protection, synchronizing and control requirements. The Customer shall provide the design drawings, operating manuals, manufacturer's brochures/instruction manual and technical specifications, manufacturer's test reports, bill of material, protection and synchronizing relays and settings, and protection, synchronizing, and control schemes for the Facility to the Company for its review, and the Company shall have the right to specify the protection and synchronizing relays and settings, and protection, synchronizing and control schemes that affect the reliability and safety of operation and power quality of the Company's system with which the Facility is interconnected ("Facility Protection Devices/Schemes"). After the implementation of the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, the Company may require changes in the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, when required by the Company's system operations, at the Company's expense. After the implementation of the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, the Company may require changes in the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, when required by the Facility's operations, at the Customer's expense.
- d. Facility protection. The Customer is solely responsible for providing adequate protection for the Facility.
- e. Customer Interconnection Facilities.
- (i) The Customer shall furnish, install, operate and maintain interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) designated by or acceptable to the Company as suitable for parallel operation of the Facility with the Company's system ("Customer Interconnection Facilities"). Such facilities shall be accessible at all times to authorized Company personnel.

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(ii) The Customer shall comply with the Company's Interconnection Standards. If a conflict exists between the Interconnection Standards and this Agreement, this Agreement shall control.

(iii) A 1) single-line diagram, 2) relay list, trip scheme and settings of the Facility, 3) Facility Equipment List, and 4) three-line diagram (if the Facility's capacity is greater than or equal to 30 kW), which identify the circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes, shall, after having obtained prior consent from the Company, be attached to this Exhibit B and made a part hereof at the time the Agreement is signed. The single-line diagram shall include pertinent information regarding operation, protection, synchronizing, control, monitoring and alarm requirements. The single-line diagram and three-line diagram shall expressly identify the point of interconnection of the Facility to the Company's system. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Facility in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Facility's configuration, including relays, meters, and test switches.

f. Approval of Design Drawings. If the Facility's capacity is greater than or equal to 30 kW, the single-line diagram, relay list, trip scheme and settings of the Facility, and three-line diagram shall be approved by a Professional Electrical Engineer registered in the State of Hawaii prior to being submitted to the Company. Such approval shall be indicated by the engineer's professional seal on all drawings and documents.

## 2. Verification Testing.

a. Upon initial parallel operation of the Facility, or any time interface hardware or software is changed, a verification test of Customer Interconnection Facilities shall be performed by Customer. A qualified individual, hired or employed by the Customer, shall perform the verification testing in accordance with the manufacturer's published test

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procedure. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment. The Company reserves the right to witness verification testing or require written certification that the testing was performed.

- b. Verification testing shall be performed every four years. All verification tests prescribed by the manufacturer shall be performed. If wires must be removed to perform certain tests, each wire and each terminal shall be clearly and permanently marked. The Customer shall maintain verification test reports for inspection by the Company.
- c. Single-phase inverters rated 10 kVA and below (if any) shall be verified once per year as follows: once per year the Customer shall operate the load break disconnect switch and verify the Facility automatically shuts down and does not reconnect with the Company's system until the Company's system continuous normal voltage and frequency have been maintained for a minimum of 5 minutes. The Customer shall maintain a log of these operations for inspection by the Company.
- d. Any system that depends upon a battery for trip power shall be checked once per month for proper voltage. Once every four (4) years the battery shall either be replaced or have a discharge test performed. The Customer shall maintain a log of these operations for inspection by the Company.
- e. Tests and battery replacements as specified in this section 2 of Exhibit B shall be at the Customer's expense.

3. Inspection of the Facility.

- a. The Company may, in its discretion and upon reasonable notice not to be less than 24 hours (unless otherwise agreed to by the Company and the Customer), observe the construction of the Facility (including but not limited to relay settings and trip schemes) and the equipment to be installed therein.
- b. Within fourteen days after receiving a written request from the Customer to begin producing electric energy in parallel with the Company's system, the Company may inspect the

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Facility (including but not limited to relay settings and trip schemes) and observe the performance of the verification testing. The Company may accept or reject the request to begin producing electric energy based upon the inspection or verification test results.

- c. If the Company does not perform an inspection of the Facility (including but not limited to relay settings and trip schemes) and observe the performance of verification testing within the fourteen-day period, the Customer may begin to produce energy after certifying to the Company that the Facility has been tested in accordance with the verification testing requirements and has successfully completed such tests. After receiving the certification, the Company may conduct an inspection of the Facility (including but not limited to relay settings and trip schemes) and make reasonable inquiries of the Customer, but only for purposes of determining whether the verification tests were properly performed. The Customer shall not be required to perform the verification tests a second time, unless irregularities appear in the verification test report or there are other objective indications that the tests were not properly performed in the first instance.
- d. The Company may, in its discretion and upon reasonable notice not to be less than 24 hours (unless an apparent safety or emergency situation exists which requires immediate inspection to resolve a known or suspected problem), inspect the Facility (including but not limited to relay settings and trip schemes) and its operations (including but not limited to the operation of control, synchronizing, and protection schemes) after the Facility commences operations.

#### 4. Operating Records and Procedures.

- a. The Company may require periodic reviews of the maintenance records, and available operating procedures and policies of the Facility.
- b. The Customer must separate the Facility from the Company's system whenever requested to do so by the Company's System Operator pursuant to Sections 8, 9, and 11 of the Agreement. It is understood and agreed that at times it may not be possible for the Company to accept electric energy due to

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temporary operating conditions on the Company's system, and these periods shall be specified by the Company's System Operator. Notice shall be given in advance when these are scheduled operating conditions.

- c. Logs shall be kept by the Customer for information on unit availability including reasons for planned and forced outages; circuit breaker trip operations, relay operations, including target initiation and other unusual events. The Company shall have the right to review these logs, especially in analyzing system disturbance.

5. Changes to the Facility, Operating Records, and Operating Procedures.

- a. The Customer agrees that no material changes or additions to the Facility as reflected in the single-line diagram, relay list, trip scheme and settings of the Facility, Facility Equipment List, and three-line diagram (if the Facility's capacity is greater than or equal to 30 kW), shall be made without having obtained prior written consent from the Company.
- b. As a result of the observations and inspections of the Facility (including but not limited to relay list, trip scheme and settings) and the performance of the verification tests, if any changes in or additions to the Facility, operating records, and operating procedures and policies are required by the Company, the Company shall specify such changes or additions to the Customer in writing, and the Customer shall, as soon as practicable, but in no event later than thirty (30) days after receipt of such changes or additions, respond in writing, either noting agreement and action to be taken or reasons for disagreement. If the Customer disagrees with the Company, it shall note alternatives it will take to accomplish the same intent, or provide the Company with a reasonable explanation as to why no action is required by good engineering practice.

(Additional terms and provisions to be added as necessary. Note: This parenthetical phrase should be deleted when the agreement is finalized.)

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Facility Equipment List

The Facility shall include the following equipment:

(Specific items to be added as necessary. Note: This parenthetical phrase should be deleted when the agreement is finalized.)

(This Facility Equipment List, together with the single-line diagram, relay list and trip scheme, and three-line diagram (if the Facility's capacity is greater than or equal to 30 kW), should be attached behind Exhibit B. Note: This parenthetical phrase should be deleted when the agreement is finalized.)

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EXHIBIT C

INTERCONNECTION FACILITIES OWNED BY THE COMPANY

1. Description of Company Interconnection Facilities

The Company will purchase, construct, own, operate and maintain all interconnection facilities required to interconnect the Company's system with the Facility at \_\_\_ volts, up to the point of interconnection.

The Company Interconnection Facilities, for which the Customer agrees to pay, include:

[Need to specify the interconnection facilities. If no interconnection facilities, state "None".]

2. Customer Payment to Company for Company Interconnection Facilities, Review of Facility, and Review of Verification Testing

The Customer shall pay to the Company the total estimated interconnection cost to be incurred by the Company (Total Estimated Interconnection Cost), which is comprised of (i) the estimated cost of the Company Interconnection Facilities, (ii) the estimated engineering costs associated with a) developing the Company Interconnection Facilities and b) reviewing and specifying those portions of the Facility which allow interconnected operations as such are described in Exhibit B, and iii) reviewing the verification testing. The following summarizes the Total Estimated Interconnection Cost:

<u>Description</u>	<u>Estimated Cost (\$)</u>
[Need to specify the estimated interconnection cost. If no cost, state "None". If the Company determines that there are benefits to the utility system due to the Company interconnection facilities, a credit reflecting these benefits shall be provided to the Customer, subject to Commission approval. See Appendix III, Section 2.d concerning this subject. The amount of the credit reflecting these benefits, if any, would be reflected in this section of the Standard Interconnection Agreement.]	
<b>Total Estimated Interconnection Cost</b>	<b>\$</b>

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The Total Estimated Interconnection Cost, which, except as otherwise provided herein, is non-refundable, shall be paid by the Customer fourteen (14) days after receipt of an invoice from the Company, which shall be provided not less than thirty (30) days prior to start of procurement of the Company Interconnection Facilities.

Within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of completion of construction of the Company Interconnection Facilities, the Customer shall remit to the Company the difference between the Total Estimated Interconnection Cost paid to date and the lesser of one hundred twenty percent (120%) of the Total Estimated Interconnection Cost or the total actual interconnection cost (Total Actual Interconnection Cost). The latter is comprised of (i) the total costs of the Company Interconnection Facilities, and (ii) the total engineering costs associated with a) developing the Company Interconnection Facilities and b) reviewing and specifying those portions of the Facility which allow interconnected operations as such are described in Exhibit B, and iii) reviewing the verification testing. If in fact the Total Actual Interconnection Cost is less than the payments received by the Company as the Total Estimated Interconnection Cost, the Company shall repay the difference to the Customer within thirty (30) days of the final accounting.

If the Agreement is terminated prior to the Customer's payment for the Total Actual Interconnection Cost (or the portion of this cost which has been incurred) or prior to the Company's repayment of the overcollected amount of the Total Estimated Interconnection Cost (or the portion of this cost which has been paid), such payments shall be made by the Customer or Company, as appropriate. If payment is due to the Company, the Customer shall pay within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of the date the Agreement is terminated. If payment is due to the Customer, the Company shall pay within thirty (30) days of the final accounting.

All Company Interconnection Facilities shall be the property of the Company.

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3. Operation, Maintenance and Testing Costs

The Company will bill the Customer monthly and the Customer will, within 30 days after the billing date, reimburse the Company for any costs incurred in operating, maintaining or testing the Company Interconnection Facilities, to the extent such costs are not included in or are not appropriate for inclusion in the Company's base rates. The Company's costs will be determined on the basis of outside service costs, direct labor costs, material costs, transportation costs, applicable overheads at time incurred and applicable taxes. Applicable overheads will include such costs as vacation, payroll taxes, non-productive wages, supervision, tools expense, employee benefits, engineering administration, corporate administration, and materials handling. Applicable taxes will include the Public Service Company Tax, and Public Utility Fee.

4. Customer Use of Company Interconnection Facilities Upon Termination

Notwithstanding that all Company Interconnection Facilities are the property of the Company, upon termination of the Agreement, the Company shall identify any equipment paid for by the Customer that can feasibly be returned to the Customer. If Customer desires such equipment, Customer shall pay for the removal of the equipment and the restoration of the Company's system to the Company's satisfaction.

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EXHIBIT D

CUSTOMER INSURANCE COVERAGE

In accordance with section 19 of the Agreement, Customer shall maintain the following insurance and under the following conditions:

In the alternative, in accordance with section 19 of the Agreement, Customer shall self insure against risks arising under this Agreement in the following manner and under the following conditions:

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## APPENDIX II-A

### STANDARD THREE PARTY INTERCONNECTION AGREEMENT

THIS AGREEMENT ("Agreement") is made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, by and between Hawaii Electric Light Company, Inc., hereinafter called the Company, and \_\_\_\_\_, hereinafter called the Customer AND \_\_\_\_\_, hereinafter called Owner. Customer and Owner shall be collectively referred to as "Facility Parties".

WHEREAS, the Customer is the recipient of electric service in accordance with the Company's Tariff; and

WHEREAS, the Owner is the owner of a generating facility ("Facility"), as identified in Exhibit A and defined in Section 3 of this Agreement; and

WHEREAS, the Owner may operate the Facility, or the Owner may subcontract the operation of the Facility to another party; and

WHEREAS the Owner intends to sell power to the Customer from the Facility; and

WHEREAS, the Facility Parties desire to interconnect the Facility in parallel with the Company's system upon the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the premises and the respective promises herein, the Company and the Facility Parties hereby agree as follows:

1. Scope Of Agreement: This Agreement relates solely to the conditions under which the Company and the Facility Parties agree that the Facility may be interconnected to and operated in parallel with the Company's system.
2. Parallel Operation: The Facility may interconnect and operate in parallel with the Company's system in accordance with the terms and conditions of this Agreement.
3. Facility:
  - (a) For the purposes of this Agreement, the "Facility" is defined as the equipment and devices, and associated appurtenances, owned by the Owner, which produce electric energy for use by the Facility Parties and are to be

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interconnected and operated in parallel with the Company's system.

- (b) The Facility Parties shall furnish, install, operate and maintain, at its cost, the interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) identified in Exhibit B hereto ("Facility Parties Interconnection Facilities").
- (c) The point of interconnection is shown on the single-line diagram and three-line diagram (provided by the Facility Parties and reviewed by the Company) which are attached to Exhibit B (provided that the three-line diagram is not required if the Facility's capacity is less than 30 kW).
- (d) The Facility Parties agree to test the Facility, to maintain operating records, and to follow such operating procedures, as may be specified by the Company to protect the Company's system from damages resulting from the parallel operation of the Facility, including such testing, records and operating procedures as more fully described in Exhibit B attached hereto and made a part hereof.
- (e) The Company may inspect the Facility, as more fully described in Exhibit B.

4. Interconnection Facilities Owned by the Company: The Company agrees to furnish, install, operate and maintain such interconnection facilities on its side of the point of interconnection with the Facility as required for parallel operation with the Facility and as more fully described in Exhibit C attached hereto and made a part hereof ("Company Interconnection Facilities"). All such interconnection facilities shall be the property of the Company. Where portions of the Company Interconnection Facilities are located on the premises of the Facility Parties, the Facility Parties shall provide, at no expense to the Company, a suitable location for and access to all such equipment. If a 120/240 Volt power source or sources are required, the Facility Parties shall provide these at no expense to the Company.

5. Facility Parties Payments:

- (a) The Facility Parties agree to pay to the Company a reasonable non-refundable contribution for the Company's

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investment in the interconnection facilities described in Exhibit C, subject to the terms and conditions included in Exhibit C, and to pay for other reasonable interconnection costs. The interconnection costs will not include the cost of an initial technical screening of the impact of the Facility on the Company's system, but will include the actual cost (or such lesser amount as the Company may specify to facilitate the processing of interconnection requests for similarly situated facilities) of additional technical study for the Facility, if additional technical study is conducted.

- (b) [FOR FEDERAL GOVERNMENT ENTITIES (the "FGE") - Replace paragraph (a) with the following:]

The FGE agrees to pay to the Company a reasonable non-refundable contribution for the Company's investment in the interconnection facilities described in Exhibit C, and to pay for other reasonable interconnection costs by means of a modification to the existing electric service contract or other contracting vehicle. The contract modification shall be executed prior to effectuating this Agreement.

6. Commencement of Producing Energy in Parallel: After this Agreement is executed, and the Facility Parties Interconnection Facilities and the Company Interconnection Facilities are completed, the Facility may be operated in parallel with the Company's system, provided that the Facility Parties have satisfied the conditions in Section 3 of Exhibit B of this Agreement.
7. Incidental Deliveries of Energy: The Company shall have no duty under this Agreement to account for, pay for, deliver, or return in kind any energy produced by the Facility and delivered into the Company's system. The meter for service received from the Company shall be ratcheted to prevent reverse registration.
8. Disconnection of Facility for Utility Reasons:
- (a) Upon providing reasonable notice (generally not to be less than ten (10) business days for scheduled work), the Company may require the Facility Parties to temporarily disconnect the Facility from the Company's system when necessary for the Company to construct, install, maintain, repair, replace, remove, investigate, test or inspect any of its equipment or other customers' equipment or any part of its

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system. If the Company determines that such disconnection is necessary because of an unexpected system emergency, forced outage, operating conditions on its systems, or compliance with good engineering practices as determined by the Company, the Company will immediately attempt to notify the Facility Parties or the Facility Parties' designated representatives in person, by telephone, by electronic mail, or by facsimile, of the need to disconnect the Facility. Unless the emergency condition requires immediate disconnection as determined by the Company, the Company shall allow sufficient time for the Facility Parties to manually disconnect the Facility.

- (b) The Facility shall not energize a de-energized utility line under any circumstances, but may operate its Facility isolated from the utility system with an open tie point in accordance with Section 4.i of Appendix I to HELCO Tariff Rule 14H.
- (c) Following the completion of work and/or rectification of the emergency conditions by the Company, the Company shall reset the Facility Parties' service breaker, if open, as soon as practicable and shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the Company and the Facility Parties, written documentation of the occurrence and nature of the Company's work and/or emergency condition, and of the disconnection of the Facility.
- (d) The Company shall take reasonable steps to minimize the number and duration of such disconnections.
- (e) The disconnection of the Facility under this Section 8 shall not be subject to standby service charges under the Company's Schedule SS Standby Service tariff.
- (f) The Company may disconnect the Facility Parties from the Company's system for failure by the Facility Parties to disconnect the Facility under this Section 8, until such time that the Company's work or the system condition has been corrected and the normal system condition has been restored.

9. Personnel and System Safety: Notwithstanding any other provisions of this Agreement, the Company may disconnect the Facility from the Company's system, without prior notice to the

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Facility Parties, (a) to eliminate conditions that constitute a potential hazard to the Company's personnel or the general public; (b) if pre-emergency or emergency conditions exist on the Company system; (c) if a hazardous condition relating to the Facility is observed by the Company's inspection; (d) if the Facility interferes with the Company's equipment or equipment belonging to other customers of the Company (including non-utility generating equipment); or (e) if the Facility Parties have tampered with any protective device. The Facility shall remain disconnected until such time as the Company is satisfied that the endangering condition(s) as listed above has been corrected, and the Company shall not be obligated to allow parallel operation of the Facility during such period. If the Company disconnects the Facility under this Section 9, it shall as soon as practicable notify the Facility Parties in person, by telephone, by electronic mail, or by facsimile and provide the reason(s) why the Facility was disconnected from the Company's system. Following the rectification of the endangering conditions, the Company shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the Company and the Facility Parties, written documentation of the occurrence of the endangering conditions, and of the disconnection of the Facility. The disconnection of a Facility Parties generating facility shall not be subject to standby service charges provided that the disconnection was caused by the utility or the utility's equipment. The procedure for determining the applicability of standby charges to a disconnection event shall be specified in the Company's Schedule SS Standby Service tariff.

10. Transmission Service Not Provided with Interconnection:  
Interconnection with the Company's system under this Agreement does not provide the Facility Parties any rights to utilize the Company's system for the transmission or distribution of electric power.

11. Prevention of Interference:  
The Facility Parties shall not operate equipment that superimposes a voltage or current upon the Company's system that interferes with the Company's operations, service to the Company's customers, or the Company's communication facilities. Such interference shall include, but not be limited to, overcurrent, voltage imbalance, and abnormal waveforms. If such interference occurs, the Facility Parties must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by the Company. If the

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Facility Parties does not take timely corrective action, or continues to operate the equipment causing interference without restriction or limit, the Company may, without liability, disconnect the Facility Parties equipment from the Company's system.

12. Location of Metering: Where Company-owned metering is located on the premises of the Facility Parties, the Facility Parties shall provide, at no expense to the Company, a suitable location for and access to all such metering.
13. Design Reviews and Inspections: The Company's review and authorization to allow the Facility to interconnect and operate in parallel with the Company's system shall not be construed as confirming or endorsing the Facility's design or as warranting the Facility's safety, durability or reliability. The Company shall not, by reason of such review or lack of review, be responsible for the equipment, including but not limited to, the safety, strength, adequacy, durability, reliability, performance, or capacity of such equipment.
14. Permits, Approvals, and Licenses: The Facility Parties shall obtain, at its expense, any and all authorizations, approvals, permits, and licenses required for the construction and operation of the Facility and the interconnection with the Company's system, including but not limited to environmental permits, building permits, rights-of-way, or easements.
15. Term: This Agreement shall become effective when executed by the Facility Parties and the Company and shall continue in effect until terminated.
16. Termination: This Agreement may be terminated as follows: (a) the Facility Parties may terminate this Agreement at any time, by giving the Company at least sixty (60) days written notice, provided that the Facility is disconnected from the Company's system and no longer operating in parallel with the Company's system at the time this Agreement is terminated; (b) the Company may terminate this Agreement upon failure by the Facility Parties to generate energy from the Facility in parallel with the Company's system within twelve (12) months after completion of the interconnection; (c) either party may terminate this Agreement by giving the other party at least thirty (30) days prior written notice that the other party is in default of any of the material terms and conditions of the Agreement, provided that the notice specifies the basis for the termination and there is a

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reasonable opportunity to cure the default; (d) the Company may terminate this Agreement if the Facility is removed from permanent service; (e) the Company and the Facility Parties may terminate this Agreement at any time by mutual agreement provided that the agreement is in writing and signed by both parties; or (f) the Company may terminate this Agreement by giving the Facility Parties at least sixty (60) days prior written notice in the event that there is a material change in an applicable statute, rule or tariff.

17. Disconnection and Survival of Obligations: Upon termination of this Agreement the Facility shall be disconnected from the Company's system. The termination of this Agreement shall not relieve the parties of their liabilities and obligations, owed or continuing at the time of the termination.

18. Indemnification:

(a) The Customer shall indemnify, defend and hold harmless the Company and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Company's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Customer (or those of anyone under their control or on their behalf) with respect to their obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Facility and/or Customer Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Company or its officers, directors, agents or employees.

(b) The Owner shall indemnify, defend and hold harmless the Company and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Company's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Owner (or those of anyone under their control or on their behalf) with respect to their obligations under this Agreement, and/or arising out of the installation, operation

HAWAII ELECTRIC LIGHT COMPANY, INC.

and maintenance of the Facility and/or Owner Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Company or its officers, directors, agents or employees.

- (c) The Company shall indemnify, defend and hold harmless the Facility Parties, and their officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Facility Parties' employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Company (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Company Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Facility Parties or their officers, directors, agents or employees
- (d) Nothing in this Agreement shall create any duty to, any standard of care with reference to, or any liability to any person or entity not a party to it.
- (e) **[FOR OWNER OR CUSTOMER THAT IS AN AGENCY OF THE STATE OF HAWAII (the "State")]**  
The State shall be responsible for damages or injury caused by the State's agents, officers, and employees in the course of their employment to the extent that the State's liability for such damage or injury has been determined by a court or otherwise agreed to by the State. The State shall pay for such damage and injury to the extent permitted by law. The State shall use reasonable good faith efforts to pursue any approvals from the Legislature and the Governor that may be required to obtain the funding necessary to enable the State to perform its obligations or cover its liabilities hereunder. The State shall not request Company to indemnify the State for, or hold the State harmless from, any claims for such damages or injury.

Company shall be responsible for damages or injury caused by Company, Company's agents, officers, and employees in the course of their employment to the extent that Company's

HAWAII ELECTRIC LIGHT COMPANY, INC.

liability for such damage or injury has been determined by a court or otherwise agreed to by Company, and Company shall pay for such damage and injury to the extent permitted by law. Company shall not request the State to indemnify Company for, or hold Company harmless from, any claims for such damages or injury.

- (f) [FOR FEDERAL GOVERNMENT ENTITIES (the "FGE") - delete paragraphs (a) through (e) and replace with the following:]

Neither party hereto shall be responsible for loss or damage to the property of the other party or property of others, or for death or for personal injuries to the other party's officers, agents, servants, or employees, or to other persons, arising from or related to (a) the Company's initiation of a service interruption under this contract and /or (b) the FGE's electric service being disconnected or reconnected by the Company and/or FGE pursuant to this contract and/or (c) the parallel operation of the systems of the parties hereto or incident to the use, operation, or maintenance with respect to the furnishing of service hereunder, except for such loss, damage, death or injuries caused by the FGE for which it may be liable under the Federal Tort Claims Act and in the case of the Company as may be caused by the negligence, wrongful act or omission of the Company, its agents, servants or employees; nor, except for matters for which it may be liable under the Federal Tort Claims Act, shall the FGE be responsible in any way for any damage or loss of profit suffered by the Company arising from or incident to such use, operation or maintenance.

19. Insurance:

- (a) The Facility Parties shall, at their own expense and during the term of the Agreement and any other time that the Facility is interconnected with the Company's system, either (a) maintain in effect with a responsible insurance company authorized to do insurance business in Hawaii, insurance that will adequately protect the Facility Parties and the Company with respect to risks arising under this Agreement, including the Facility's interconnection with the Company's system, provided the forms, amounts and conditions of such insurance coverage shall be as specified in Exhibit D hereto, or (b) self insure, in lieu of obtaining insurance coverage from an insurance company, provided the terms of such self insurance shall be as specified in Exhibit D

HAWAII ELECTRIC LIGHT COMPANY, INC.

hereto. Facility Parties are responsible for determining its own level and form of insurance. The Facility Parties' indemnity and other obligations shall not be limited by this provision. Any deductible shall be the responsibility of the Facility Parties. In the event Facility Parties obtains insurance from an insurance company, proof of such insurance, including certificates of insurance showing the form and amounts of coverage, must be provided to the Company prior to any parallel interconnection. In the event Facility Parties self insures, documentation describing the Facility Parties' means and capability of self-insuring must be provided to the Company prior to any parallel interconnection.

- (b) [FOR FEDERAL GOVERNMENT ENTITIES (the "FGE") - delete paragraph (a) and insert the following:]

The Interconnection Customer is considered to be self-insured for the purpose of this agreement and shall not be required to maintain any separate policy of insurance under this section of the agreement. Notwithstanding the above, this shall in no event waive or otherwise release or limit the Interconnection Customer's liabilities undertaken pursuant to this agreement. The Company agrees to maintain general liability insurance or self-insurance consistent with the Company's commercial practice. Such insurance or self-insurance shall not exclude coverage for the Company's liabilities undertaken pursuant to this agreement. The parties to this agreement further agree to notify each other whenever an accident or incident occurs resulting in any injuries or damages that are included within the scope of coverage of such insurance, whether or not such coverage is sought.

20. Force Majeure: For purposes of this Agreement, "Force Majeure Event" means any event: (a) that is beyond the reasonable control of the affected party; and (b) that the affected party is unable to prevent or provide against by exercising reasonable diligence, including the following events or circumstances, but only to the extent they satisfy the preceding requirements: acts of war, public disorder, insurrection, or rebellion; floods, hurricanes, earthquakes, lightning, storms, and other natural calamities; explosions or fires; strikes, work stoppages, or labor disputes; embargoes; and sabotage. If a Force Majeure Event prevents a party from fulfilling any obligations under this Agreement, such party will promptly notify the other party in writing, and will

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keep the other party informed on a continuing basis of the scope and duration of the Force Majeure Event. The affected party will specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the affected party is taking to mitigate the effects of the event on its performance. The affected party will be entitled to suspend or modify its performance of obligations under this Agreement, other than the obligation to make payments then due or becoming due under this Agreement, but only to the extent that the effect of the Force Majeure Event cannot be mitigated by the use of reasonable efforts. The affected party will use reasonable efforts to resume its performance as soon as possible.

21. Warranties: The Company, and the Facility Parties each represents and warrants respectively that:

- (a) It has all necessary right, power and authority to execute, deliver and perform this Agreement.
- (b) The execution, delivery and performance of this Agreement by it will not result in a violation of any law or regulation of any governmental authority, or conflict with, or result in a breach of, or cause a default under, any agreement or instrument to which such party is also a party or by which it is bound.

22. Good Engineering Practice:

- (a) Each party agrees to install, operate and maintain its respective equipment and facilities and to perform all obligations required to be performed by such party under this Agreement in accordance with good engineering practice in the electric industry and with applicable laws, rules, orders and tariffs.
- (b) Wherever in this Agreement and the attached Exhibits the Company has the right to give specifications, determinations or approvals, such specifications, determinations or approvals shall be given in accordance with the Company's standard practices, policies and procedures, which may include the Company's Electric Service Installation Manual, the Company's Engineering Standard Practice Manual and IEEE Guides and Standards for Protective Relaying Systems.

HAWAII ELECTRIC LIGHT COMPANY, INC.

23. Miscellaneous:

- (a) Amendments. Any amendment or modification of this Agreement or any part hereof shall not be valid unless in writing and signed by the parties. Any waiver hereunder shall not be valid unless in writing and signed by the party against whom waiver is asserted.
- (b) Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors, legal representatives, and permitted assigns.
- (c) Notices. Any written notice provided hereunder shall be delivered personally or sent by registered or certified first class mail, with postage prepaid, to the other party at the following addresses:

Company: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Attn: \_\_\_\_\_

Customer: The mailing address listed in Exhibit A attached hereto.

Owner: The mailing address listed in Exhibit A attached hereto.

Notice sent by mail shall be deemed to have been given on the date of actual delivery or at the expiration of the fifth day after the date of mailing, whichever is earlier. Any party hereto may change its address for written notice by giving written notice of such change to the other party hereto.

- (d) Effect of Section and Exhibit Headings. The headings or titles of the several sections and exhibits hereof are for convenience of reference and shall not affect the construction or interpretation of any provision of this Agreement.
- (e) Relationship of Parties. Nothing in this Agreement shall be deemed to constitute any party hereto as partner, agent or representative of the other party or to create any fiduciary relationship between the parties.

HAWAII ELECTRIC LIGHT COMPANY, INC.

- (f) Entire Agreement. This Agreement constitutes the entire understanding and agreement between the Company and the Facility Parties.
- (g) Limitations. Nothing in this Agreement shall limit the Company's ability to exercise its rights or expand or diminish its liability with respect to the provision of electrical service pursuant to the Company's Tariff as filed with the State of Hawaii Public Utilities Commission ("PUC"), or the PUC's Standards for Electric Utility Service in the State of Hawaii, which currently are included in the PUC's General Order Number 7, as either may be amended from time to time.
- (h) Governing Law and Regulatory Authority. This Agreement was executed in the State of Hawaii and must in all respects be governed by, interpreted, construed, and enforced in accordance with the laws thereof. This Agreement is subject to, and the parties' obligations hereunder include, operating in full compliance with all valid, applicable federal, state, and local laws or ordinances, and all applicable rules, regulations, orders of, and tariffs approved by, duly constituted regulatory authorities having jurisdiction.
- (i) Multiple Counterparts. This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

HAWAII ELECTRIC LIGHT COMPANY, INC.

Superseding SHEET NO. 38C-47  
Effective May 27, 2010

REVISED SHEET NO. 38C-47  
Effective December 3, 2011

IN WITNESS WHEREOF, the Company and the Facility Parties have executed this Agreement as of the day and year first above written.

By \_\_\_\_\_  
Name:  
Title:  
Date:

By \_\_\_\_\_  
Name:  
Title:  
Date:

By \_\_\_\_\_  
Name:  
Title:  
Date:

"Company"

"Customer"

By \_\_\_\_\_  
Name:  
Title:  
Date:

"Owner"

HAWAII ELECTRIC LIGHT COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.



**EXHIBIT A**

**Application for Interconnecting a UL1741 Certified Inverter-Based Small  
Generating Facility No Larger than 10kW**

This Application is considered complete when it provides all applicable and correct information required below. Additional information to evaluate the Application may be required.

Customer

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Daytime):  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

Electric Service Company and Account No.:

Facility Location (if different from above): \_\_\_\_\_

Facility Location Tax Map Key number: \_\_\_\_\_

Owner of the Generating Facility (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Daytime):  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

Operator (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Daytime):  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

HAWAII ELECTRIC LIGHT COMPANY, INC.

**Generating Facility Information**

Inverter Manufacturer(s): \_\_\_\_\_ Model(s) \_\_\_\_\_

Nameplate Rating: \_\_\_\_\_ (kW) \_\_\_\_\_ (kVA) \_\_\_\_\_ (AC Volts) (CEC-CSI)<sup>1</sup>

Single Phase \_\_\_\_\_ Three Phase \_\_\_\_\_

System Design Capacity: \_\_\_\_\_ (kW) \_\_\_\_\_ (kVA) \_\_\_\_\_ (AC Volts) (CEC-CSI)

Prime Mover: Photovoltaic  Reciprocating Engine  Fuel Cell

Turbine  Other \_\_\_\_\_

Energy Source: Solar  Wind  Hydro  Diesel  Natural Gas

Fuel Oil  Other (describe) \_\_\_\_\_

Is the equipment UL1741 Listed? Yes \_\_\_\_\_ No \_\_\_\_\_

If Yes, attach manufacturer's cut-sheet showing UL1741 listing

Is the system self excited with the potential to island (i.e. will the equipment package include an onsite storage system)? Yes \_\_\_\_\_ No \_\_\_\_\_

Estimated Installation Date: \_\_\_\_\_ Estimated In-Service Date: \_\_\_\_\_

The 10 kW Inverter Process is available only for inverter-based Generating Facilities no larger than 10 kW that meet the codes, standards, and certification requirements of NEC, UL 1741, IEEE, County Electrical Building Codes, and the Company's interconnection requirements in effect at the time of signing this application.

List components of the Small Generating Facility equipment package that are currently certified:

Equipment Type	Certifying Entity (e.g. UL)
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

UF Trip Setting: \_\_\_\_\_ UF Time Delay (Secs) \_\_\_\_\_

**Installation Details**

Installing Electrical Contractor: \_\_\_\_\_ Firm: \_\_\_\_\_ License No.: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

<sup>1</sup> CEC-CSI means the California Energy Commission's ratings under the California Solar Initiative program.  
HAWAII ELECTRIC LIGHT COMPANY, INC.

Superseding SHEET NO. 38C-50  
Effective May 27, 2010

REVISED SHEET NO. 38C-50  
Effective December 3, 2011

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone: Area Code: \_\_\_\_\_ Number: \_\_\_\_\_

Installation Date: \_\_\_\_\_ Interconnection Date: \_\_\_\_\_

Supply certification that the generating system has been installed and inspected in compliance with the local Building/Electrical code of the county of \_\_\_\_\_ .

Signed (Inspector): \_\_\_\_\_ Date: \_\_\_\_\_  
(In lieu of signature of Inspector, a copy of the final inspection certificate may be attached)

**Generator/Equipment Certification**

Generating systems that utilize inverter technology must be compliant with *Institute of Electrical and Electronics Engineers IEEE Std 1547* and *Underwriters Laboratories UL 1741* in effect at the time this Agreement is executed. Generating systems that use a rotating machine must be compliant with applicable National Electrical Code, Underwriters Laboratories, and Institute of Electrical and Electronics Engineers standards and rules and orders of the Hawaii Public Utilities Commission in effect at the time this Agreement is executed. **By signing below, the Applicant certifies that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance.**

Signed (Facility Parties): \_\_\_\_\_ Date: \_\_\_\_\_

**Insurance**

Insurance Carrier: \_\_\_\_\_

HAWAII ELECTRIC LIGHT COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.

**INTERCONNECTION APPLICATION FOR ALL BUT UL1741 CERTIFIED INVERTER  
BASED SYSTEMS LESS THAN 10 KW**

In addition to the information provided below, a complete Interconnection Application includes:

1) a single-line diagram, 2) relay list, trip scheme and settings of the Generating Facility, 3) Generating Facility Equipment List, and 4) three-line diagram (if needed), which identify the circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes, shall, after having obtained prior consent from the Company, be attached to and made a part of the interconnection agreement that is signed between the Facility Parties and the Company at the end of the interconnection process.

The single-line diagram shall include pertinent information regarding operation, protection, synchronizing, control, monitoring and alarm requirements. The single-line diagram and three-line diagram shall expressly identify the point of interconnection of the Generating Facility to the Company's Distribution System. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Generating Facility in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Generating Facility's configuration, including relays, meters, and test switches.

**Section 1, Applicant Information**

Customer

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone (Daytime): \_\_\_\_\_ (Evening) \_\_\_\_\_ Area \_\_\_\_\_  
Area Code \_\_\_\_\_ Number \_\_\_\_\_ Code \_\_\_\_\_ Number \_\_\_\_\_

E-mail: \_\_\_\_\_

Facility Location (if different from above): \_\_\_\_\_

Facility Location (Tax Map Key Number): \_\_\_\_\_

Owner (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

E-mail: \_\_\_\_\_

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Telephone (Daytime): Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

Operator (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

E-mail: \_\_\_\_\_

Telephone (Daytime): Area Code \_\_\_\_\_ Number \_\_\_\_\_ (Evening) Area Code \_\_\_\_\_ Number \_\_\_\_\_

**Section 2, Generator Qualifications**

Is the generator a Qualifying Facility as defined under Subpart B, Section 201 of the Federal Energy Regulatory Commission's regulations per the Public Utility Regulatory Policies Act of 1978, or the PUC's Standards for Small Power Production and Cogeneration (Hawaii Administrative Rules Title 6, Chapter 74)?

Yes  No

Is Generator powered from a Nonfossil Fuel Source?

Yes  No

Type of Qualifying Facility or Nonfossil Fuel Source (if applicable):  Solar  Wind  Hydro  Biomass  Geothermal

Other generator energy source:  Diesel  Other Fuel Oil  Other: \_\_\_\_\_

PV Array DC Rated Output: \_\_\_\_\_ kW PV Array AC Rated Output: \_\_\_\_\_ kW (CEC-CSI)<sup>2</sup>

Maximum Site Load without Generation: \_\_\_\_\_ kW Maximum Generating Capability: \_\_\_\_\_ kW

Minimum Site Load without Generation: \_\_\_\_\_ kW Maximum Export: \_\_\_\_\_ kW

<sup>2</sup> CEC-CSI means the California Energy Commission's ratings under the California Solar Initiative program.  
HAWAII ELECTRIC LIGHT COMPANY, INC.

**Section 3. Generator Technical Information**

Type of Generator:  Synchronous  Induction  Inverter-Based Generating Facility

Generator (or solar collector) Manufacturer, Model Name & Number: \_\_\_\_\_  
(A copy of Generator Nameplate and Manufacturer's Specification Sheet may be substituted)

\_\_\_\_\_ Nameplate Rating in kW: \_\_\_\_\_  
Operating Power Factor: \_\_\_\_\_

Inverter Manufacturer, Model Name & Number (if used): \_\_\_\_\_  
(A copy of Inverter Nameplate and Manufacturer's Specification Sheet may be substituted)

\_\_\_\_\_ Rating in kW: \_\_\_\_\_  
Operating Power Factor: \_\_\_\_\_

Number of Starts Per Day: \_\_\_\_\_ Maximum Starting kVA: \_\_\_\_\_

UF Trip Setting: \_\_\_\_\_ UF Time Delay (Secs) \_\_\_\_\_

Generator Grounding Method:

- |  |   |
|--|---|
| <input type="checkbox"/> Effectively Grounded    | <input type="checkbox"/> Resonant Grounded        |
| <input type="checkbox"/> Low-Inductance Grounded | <input type="checkbox"/> High-Resistance Grounded |
| <input type="checkbox"/> Low-Resistance Grounded | <input type="checkbox"/> Ungrounded               |

Generator Characteristic Data (for rotating machines):  
(Not needed if Generator Nameplate and Manufacturer's Specification Sheet are provided)

Direct Axis Synchronous Reactance,  $X_d$ : \_\_\_\_\_ P.U. Negative Sequence Reactance: \_\_\_\_\_ P.U.

Direct Axis Transient Reactance,  $X'_d$ : \_\_\_\_\_ P.U. Zero Sequence Reactance: \_\_\_\_\_ P.U.

Direct Axis Subtransient Reactance,  $X''_d$ : \_\_\_\_\_ P.U. KVA Base: \_\_\_\_\_

Inertia Constant, H: \_\_\_\_\_ P.U.

Excitation Response Ratio: \_\_\_\_\_

Direct Axis Open-Circuit Transient Time Constant,  $T'_{do}$ : \_\_\_\_\_ Seconds

Direct Axis Open-Circuit Subtransient Time Constant,  $T''_{do}$ : \_\_\_\_\_ Seconds

Fault Current Contribution of Generator: \_\_\_\_\_ Amps

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**Section 4, Interconnecting Equipment Technical Data**

Will an interposing transformer be used between the generator and the point of interconnection?  Yes  No

Transformer Data (if applicable, for Facility Parties Owned Transformer):  
(A copy of transformer Nameplate and Manufacturer's Test Report may be substituted)

Size: \_\_\_\_\_ KVA. Transformer Primary: \_\_\_\_\_ Volts  Delta  Wye  Wye Grounded

Transformer Secondary: \_\_\_\_\_ Volts  Delta  Wye  Wye Grounded

Transformer Impedance: \_\_\_\_\_ % on \_\_\_\_\_ KVA Base

Transformer Fuse Data (if applicable, for Facility Parties Owned Fuse):  
(Attach copy of fuse manufacturer's Minimum Melt & Total Clearing Time-Current Curves)

At  Primary Voltage  Secondary Voltage

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Size: \_\_\_\_\_ Speed: \_\_\_\_\_

Transformer Protection (if not fuse):

Please describe: \_\_\_\_\_

Interconnecting Circuit Breaker (if applicable):  
(A copy of circuit breaker's Nameplate and Specification Sheet may be substituted)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Continuous Load Rating: \_\_\_\_\_ (Amps) Interrupting Rating: \_\_\_\_\_ (Amps) Trip Speed: \_\_\_\_\_ (Cycles)

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Circuit Breaker Protective Relays (if applicable):  
(Enclose copy of any proposed Time-Overcurrent Coordination Curves)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_

Current Transformer Data (if applicable):  
(Enclose copy of Manufacturer's Excitation & Ratio Correction Curves)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_ /5  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_ /5

Generator Disconnect Switch:

A generator disconnect device (isolation device) must be installed with features as described in the "HECO, HELCO, MECO Distributed Generating Facility Interconnection Standards, Technical Requirements" as set forth in Rule No. 14 (Paragraph H.1) of the Company's tariff, and which is accessible to Company.

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Catalog No.: \_\_\_\_\_ Rated Volts: \_\_\_\_\_ Rated Amps: \_\_\_\_\_  
Single or 3 Phase: \_\_\_\_\_ Mounting Location: \_\_\_\_\_

**Section 5, General Technical Information**

Enclose copy of site single-line diagram showing configuration and interconnection of all equipment, current and potential circuits and protection and control schemes.

Is Single-Line Diagram Enclosed? Yes

Enclose copy of site relay list and trip scheme, which shall include all protection, synchronizing and auxiliary relays that are required to operate the Facility in a safe and reliable manner.

Are Relay List and Trip Scheme Enclosed? Yes

Enclose copy of site three-line diagram (if the Facility's capacity is greater than or equal to 30 kW) showing potential transformer and current transformer ratios, and details of the Facility's configuration, including relays, meters, and test switches.

Is Three-Line Diagram Enclosed? Yes

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**Section 6, Installation Details**

Installing Electrical Contractor: \_\_\_\_\_ Firm: \_\_\_\_\_ License No.: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone: Area Code: \_\_\_\_\_ Number: \_\_\_\_\_

Installation Date: \_\_\_\_\_ Interconnection Date: \_\_\_\_\_

Supply certification that the generating system has been installed and inspected in compliance with the local Building/Electrical code of the county of \_\_\_\_\_ .

Signed (Inspector): \_\_\_\_\_ Date: \_\_\_\_\_  
(In lieu of signature of Inspector, a copy of the final inspection certificate may be attached)

**Section 7, Generator/Equipment Certification**

Generating systems that utilize inverter technology must be compliant with *Institute of Electrical and Electronics Engineers IEEE Std 1547* and *Underwriters Laboratories UL 1741* in effect at the time this Agreement is executed. Generating systems that use a rotating machine must be compliant with applicable National Electrical Code, Underwriters Laboratories, and Institute of Electrical and Electronics Engineers standards and rules and orders of the Hawaii Public Utilities Commission in effect at the time this Agreement is executed. **By signing below, the Applicant certifies that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance.**

Signed (Facility Parties): \_\_\_\_\_ Date: \_\_\_\_\_

**Section 8, Insurance**

Insurance Carrier: \_\_\_\_\_

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EXHIBIT B

FACILITY OWNED BY THE OWNER

1. Facility

- a. Compliance with laws and standards. The Facility, Facility design, and Facility design drawings shall meet all applicable national, state, and local laws, rules, regulations, orders, construction and safety codes, and shall satisfy the Company's Distributed Generating Facility Interconnection Standards, Technical Requirements ("Interconnection Standards"), as set forth in Rule No. 14, Paragraph H.1 of the Company's tariff.
- b. Avoidance of adverse system conditions. The Facility shall be designed, installed, operated and maintained so as to prevent or protect against adverse conditions on the Company's system that can cause electric service degradation, equipment damage, or harm to persons, such as:
- (i) Unintended islanding.
  - (ii) Inadvertent and unwanted re-energization of a Company dead line or bus.
  - (iii) Interconnection while out of synchronization.
  - (iv) Overcurrent.
  - (v) Voltage imbalance.
  - (vi) Ground faults.
  - (vii) Generated alternating current frequency outside of permitted safe limits.
  - (viii) Voltage outside permitted limits.
  - (ix) Poor power factor or reactive power outside permitted limits.
  - (x) Abnormal waveforms.

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- c. Specification of protection, synchronizing and control requirements. The Facility Parties shall provide the design drawings, operating manuals, manufacturer's brochures/instruction manual and technical specifications, manufacturer's test reports, bill of material, protection and synchronizing relays and settings, and protection, synchronizing, and control schemes for the Facility to the Company for its review, and the Company shall have the right to specify the protection and synchronizing relays and settings, and protection, synchronizing and control schemes that affect the reliability and safety of operation and power quality of the Company's system with which the Facility is interconnected ("Facility Protection Devices/Schemes"). After the implementation of the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, the Company may require changes in the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, when required by the Company's system operations, at the Company's expense. After the implementation of the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, the Company may require changes in the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, when required by the Facility's operations, at the Facility Parties' expense.
- d. Facility protection. The Facility Parties are solely responsible for providing adequate protection for the Facility.
- e. Facility Parties Interconnection Facilities.
- (i) The Facility Parties shall furnish, install, operate and maintain interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) designated by or acceptable to the Company as suitable for parallel operation of the Facility with the Company's system ("Facility Parties Interconnection Facilities"). Such facilities shall be accessible at all times to authorized Company personnel.

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(ii) The Facility Parties shall comply with the Company's Interconnection Standards. If a conflict exists between the Interconnection Standards and this Agreement, this Agreement shall control.

(iii)A 1) single-line diagram, 2) relay list, trip scheme and settings of the Facility, 3) Facility Equipment List, and 4) three-line diagram (if the Facility's capacity is greater than or equal to 30 kW), which identify the circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes, shall, after having obtained prior consent from the Company, be attached to this Exhibit B and made a part hereof at the time the Agreement is signed. The single-line diagram shall include pertinent information regarding operation, protection, synchronizing, control, monitoring and alarm requirements. The single-line diagram and three-line diagram shall expressly identify the point of interconnection of the Facility to the Company's system. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Facility in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Facility's configuration, including relays, meters, and test switches.

f. Approval of Design Drawings. If the Facility's capacity is greater than or equal to 30 kW, the single-line diagram, relay list, trip scheme and settings of the Facility, and three-line diagram shall be approved by a Professional Electrical Engineer registered in the State of Hawaii prior to being submitted to the Company. Such approval shall be indicated by the engineer's professional seal on all drawings and documents.

2. Verification Testing.

a. Upon initial parallel operation of the Facility, or any time interface hardware or software is changed, a verification test of Facility Parties Interconnection Facilities shall be performed by Facility Parties. A qualified individual, hired or employed by the Facility Parties, shall perform the

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verification testing in accordance with the manufacturer's published test procedure. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment. The Company reserves the right to witness verification testing or require written certification that the testing was performed.

- b. Verification testing shall be performed every four years. All verification tests prescribed by the manufacturer shall be performed. If wires must be removed to perform certain tests, each wire and each terminal shall be clearly and permanently marked. The Facility Parties shall maintain verification test reports for inspection by the Company.
- c. Single-phase inverters rated 10 kVA and below (if any) shall be verified once per year as follows: once per year the Facility Parties shall operate the load break disconnect switch and verify the Facility automatically shuts down and does not reconnect with the Company's system until the Company's system continuous normal voltage and frequency have been maintained for a minimum of 5 minutes. The Facility Parties shall maintain a log of these operations for inspection by the Company.
- d. Any system that depends upon a battery for trip power shall be checked once per month for proper voltage. Once every four (4) years the battery shall either be replaced or have a discharge test performed. The Facility Parties shall maintain a log of these operations for inspection by the Company.
- e. Tests and battery replacements as specified in this section 2 of Exhibit B shall be at the Facility Parties' expense.

3. Inspection of the Facility.

- a. The Company may, in its discretion and upon reasonable notice not to be less than 24 hours (unless otherwise agreed to by the Company and the Facility Parties), observe the construction of the Facility (including but not limited to relay settings and trip schemes) and the equipment to be installed therein.

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- b. Within fourteen days after receiving a written request from the Facility Parties to begin producing electric energy in parallel with the Company's system, the Company may inspect the Facility (including but not limited to relay settings and trip schemes) and observe the performance of the verification testing. The Company may accept or reject the request to begin producing electric energy based upon the inspection or verification test results.
- c. If the Company does not perform an inspection of the Facility (including but not limited to relay settings and trip schemes) and observe the performance of verification testing within the fourteen-day period, the Facility Parties may begin to produce energy after certifying to the Company that the Facility has been tested in accordance with the verification testing requirements and has successfully completed such tests. After receiving the certification, the Company may conduct an inspection of the Facility (including but not limited to relay settings and trip schemes) and make reasonable inquiries of the Facility Parties, but only for purposes of determining whether the verification tests were properly performed. The Facility Parties shall not be required to perform the verification tests a second time, unless irregularities appear in the verification test report or there are other objective indications that the tests were not properly performed in the first instance.
- d. The Company may, in its discretion and upon reasonable notice not to be less than 24 hours (unless an apparent safety or emergency situation exists which requires immediate inspection to resolve a known or suspected problem), inspect the Facility (including but not limited to relay settings and trip schemes) and its operations (including but not limited to the operation of control, synchronizing, and protection schemes) after the Facility commences operations.

4. Operating Records and Procedures.

- a. The Company may require periodic reviews of the maintenance records, and available operating procedures and policies of the Facility.

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- b. The Facility Parties must separate the Facility from the Company's system whenever requested to do so by the Company's System Operator pursuant to Sections 8, 9, and 11 of the Agreement. It is understood and agreed that at times it may not be possible for the Company to accept electric energy due to temporary operating conditions on the Company's system, and these periods shall be specified by the Company's System Operator. Notice shall be given in advance when these are scheduled operating conditions.
  - c. Logs shall be kept by the Facility Parties for information on unit availability including reasons for planned and forced outages; circuit breaker trip operations, relay operations, including target initiation and other unusual events. The Company shall have the right to review these logs, especially in analyzing system disturbance.
5. Changes to the Facility, Operating Records, and Operating Procedures.
- a. The Facility Parties agree that no material changes or additions to the Facility as reflected in the single-line diagram, relay list, trip scheme and settings of the Facility, Facility Equipment List, and three-line diagram (if the Facility's capacity is greater than or equal to 30 kW), shall be made without having obtained prior written consent from the Company.
  - b. As a result of the observations and inspections of the Facility (including but not limited to relay list, trip scheme and settings) and the performance of the verification tests, if any changes in or additions to the Facility, operating records, and operating procedures and policies are required by the Company, the Company shall specify such changes or additions to the Facility Parties in writing, and the Facility Parties shall, as soon as practicable, but in no event later than thirty (30) days after receipt of such changes or additions, respond in writing, either noting agreement and action to be taken or reasons for disagreement. If the Facility Parties disagrees with the Company, it shall note alternatives it will take to accomplish the same intent, or provide the Company with a reasonable explanation as to why no action is required by good engineering practice.

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(Additional terms and provisions to be added as necessary. Note: This parenthetical phrase should be deleted when the agreement is finalized.)

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Facility Equipment List

The Facility shall include the following equipment:

(Specific items to be added as necessary. Note: This parenthetical phrase should be deleted when the agreement is finalized.)

(This Facility Equipment List, together with the single-line diagram, relay list and trip scheme, and three-line diagram (if the Facility's capacity is greater than or equal to 30 kW), should be attached behind Exhibit B. Note: This parenthetical phrase should be deleted when the agreement is finalized.)

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EXHIBIT C

INTERCONNECTION FACILITIES OWNED BY THE COMPANY

1. Description of Company Interconnection Facilities

The Company will purchase, construct, own, operate and maintain all interconnection facilities required to interconnect the Company's system with the Facility at \_\_\_ volts, up to the point of interconnection.

The Company Interconnection Facilities, for which the Facility Parties agree to pay, include:

[Need to specify the interconnection facilities. If no interconnection facilities, state "None".]

2. Facility Parties Payment to Company for Company Interconnection Facilities, Review of Facility, and Review of Verification Testing

The Facility Parties shall pay to the Company the total estimated interconnection cost to be incurred by the Company (Total Estimated Interconnection Cost), which is comprised of (i) the estimated cost of the Company Interconnection Facilities, (ii) the estimated engineering costs associated with a) developing the Company Interconnection Facilities and b) reviewing and specifying those portions of the Facility which allow interconnected operations as such are described in Exhibit B, and iii) reviewing the verification testing. The following summarizes the Total Estimated Interconnection Cost:

<u>Description</u>	<u>Estimated Cost (\$)</u>
[Need to specify the estimated interconnection cost. If no cost, state "None". If the Company determines that there are benefits to the utility system due to the Company interconnection facilities, a credit reflecting these benefits shall be provided to the Facility Parties, subject to Commission approval. See Appendix III, Section 2.d concerning this subject. The amount of the credit reflecting these benefits, if any, would be reflected in this section of the Standard Interconnection Agreement.]	

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**Total Estimated Interconnection Cost** **\$**

The Total Estimated Interconnection Cost, which, except as otherwise provided herein, is non-refundable, shall be paid by the Facility Parties fourteen (14) days after receipt of an invoice from the Company, which shall be provided not less than thirty (30) days prior to start of procurement of the Company Interconnection Facilities.

Within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of completion of construction of the Company Interconnection Facilities, the Facility Parties shall remit to the Company the difference between the Total Estimated Interconnection Cost paid to date and the lesser of one hundred twenty percent (120%) of the Total Estimated Interconnection Cost or the total actual interconnection cost (Total Actual Interconnection Cost). The latter is comprised of (i) the total costs of the Company Interconnection Facilities, and (ii) the total engineering costs associated with a) developing the Company Interconnection Facilities and b) reviewing and specifying those portions of the Facility which allow interconnected operations as such are described in Exhibit B, and iii) reviewing the verification testing. If in fact the Total Actual Interconnection Cost is less than the payments received by the Company as the Total Estimated Interconnection Cost, the Company shall repay the difference to the Facility Parties within thirty (30) days of the final accounting.

If the Agreement is terminated prior to the Facility Parties' payment for the Total Actual Interconnection Cost (or the portion of this cost which has been incurred) or prior to the Company's repayment of the overcollected amount of the Total Estimated Interconnection Cost (or the portion of this cost which has been paid), such payments shall be made by the Facility Parties or Company, as appropriate. If payment is due to the Company, the Facility Parties shall pay within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of the date the Agreement is terminated. If payment is due to the Facility Parties, the Company shall pay within thirty (30) days of the final accounting.

All Company Interconnection Facilities shall be the property of the Company.

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3. Operation, Maintenance and Testing Costs

The Company will bill the Facility Parties monthly and the Facility Parties will, within 30 days after the billing date, reimburse the Company for any costs incurred in operating, maintaining or testing the Company Interconnection Facilities, to the extent such costs are not included in or are not appropriate for inclusion in the Company's base rates. The Company's costs will be determined on the basis of outside service costs, direct labor costs, material costs, transportation costs, applicable overheads at time incurred and applicable taxes. Applicable overheads will include such costs as vacation, payroll taxes, non-productive wages, supervision, tools expense, employee benefits, engineering administration, corporate administration, and materials handling. Applicable taxes will include the Public Service Company Tax, and Public Utility Fee.

4. Facility Parties Use of Company Interconnection Facilities Upon Termination

Notwithstanding that all Company Interconnection Facilities are the property of the Company, upon termination of the Agreement, the Company shall identify any equipment paid for by the Facility Parties that can feasibly be returned to the Facility Parties. If Facility Parties desire such equipment, Facility Parties shall pay for the removal of the equipment and the restoration of the Company's system to the Company's satisfaction.

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EXHIBIT D

FACILITY PARTIES INSURANCE COVERAGE

In accordance with section 19 of the Agreement, Facility Parties shall maintain the following insurance and under the following conditions:

In the alternative, in accordance with section 19 of the Agreement, Facility Parties shall self insure against risks arising under this Agreement in the following manner and under the following conditions:

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**APPENDIX II-B**

**TECHNICAL DESCRIPTION AND REGISTRATION FOR NON-EXPORT SYSTEMS  
(ONLY USE FOR RULE 3B REGISTRATIONS OR MOMENTARY-/NON-PARALLEL  
OPERATION)**

Check One:

- Non-interconnected generators (Rule 3B Registration) (Complete Sections 1, 2 and 4 only)
- Momentary-Parallel Operation (Complete Sections 1, 3 and 4 only)
- Non-Parallel Operation (Complete Sections 1, 3 and 4 only)
- Parallel Operation (**STOP – Inquire with your utility for the program that applies for your system**)

**Under no circumstances shall a Customer–Generator interconnect and operate a generating facility in parallel with the company’s electric system without prior written approval by the Company.**

**SECTION 1: PARTY INFORMATION:**

**Customer Information:**

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone (Daytime): (     ) \_\_\_\_\_ Phone (Evening): (     ) \_\_\_\_\_

Fax: (     ) \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

Electric Service Company and Account No.: \_\_\_\_\_

Facility Location (if different from above): \_\_\_\_\_

Facility Location Tax Map Key No.: \_\_\_\_\_

**Owner of the Generating Facility (if different from Customer)**

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

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Phone (Daytime): (     ) \_\_\_\_\_ Phone (Evening): (     ) \_\_\_\_\_  
Fax: (     ) \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

**Operator (if different from Customer and Owner)**

Name: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone (Daytime): (     ) \_\_\_\_\_ Phone (Evening): (     ) \_\_\_\_\_  
Fax: (     ) \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

**SECTION 2: NON-INTERCONNECTED GENERATORS - RULE 3B REGISTRATION**

System Description \_\_\_\_\_ (attach single line drawing)

Prime Mover  Photovoltaic                       Reciprocating Engine  
 Fuel Cell                       Turbine  
 Other (describe) \_\_\_\_\_

Energy Source  Solar                       Wind                       Hydro  
 Diesel                       Natural Gas                       Fuel Oil  
 Other (describe) \_\_\_\_\_

Energy Storage (if applicable):  
 Stand-by power supply                       Serving isolated load  
 Other (describe): \_\_\_\_\_

Will the Distribution Grid be used to charge the storage Device?

No  
 Yes (provide manufacturer's data sheet for charger)

If yes, what times of the day do you expect to charge your storage device? : \_\_\_\_\_  
\_\_\_\_\_

**SECTION 3: INTERCONNECTED, NON-PARALLEL, MOMENTARY-PARALLEL OPERATION**

System Description \_\_\_\_\_ (attach single line drawing)

Attach specifications of your Switch or Inverter to verify 100ms (or less) operation or non-parallel operation.

Inverter

Manufacturer(s) \_\_\_\_\_ Model(s) \_\_\_\_\_

Nameplate Rating(s)(CEC-CSI) \_\_\_\_\_ (kW) \_\_\_\_\_ (kVA) \_\_\_\_\_ (AC Volts)

Single Phase or  Three Phase

Prime Mover  Photovoltaic  Reciprocating Engine

Fuel Cell  Turbine

Other (describe)

Energy Source  Solar  Wind  Hydro

Diesel  Natural Gas  Fuel Oil

Other (describe \_\_\_\_\_)

Since your system is self-excited, does it use a storage system?  Yes  No

If yes, what is the storage system information (attach Data Sheets)

Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_

System Voltage: \_\_\_\_\_ Total usable kWh Capacity \_\_\_\_\_

Total Discharge Power kW: \_\_\_\_\_ Maximum Charge power kW \_\_\_\_\_

Description of Battery use:

Stand-by power supply  Serving isolated load

Other (describe): \_\_\_\_\_

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Will the Distribution Grid be used to charge the storage Device?

No

Yes (provide manufacturer's data sheet for charger)

If yes, list what times of the day do you expect to charge your storage device.

**SECTION 4 (INSTALLATION DETAILS):**

Installing Electrical Contractor: \_\_\_\_\_

Firm: \_\_\_\_\_ License No.: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
\_\_\_\_\_

Phone (daytime):( ) \_\_\_\_\_ Phone (Evening):( ) \_\_\_\_\_  
\_\_\_\_\_

Fax: ( ) \_\_\_\_\_ E-Mail Address: \_\_\_\_\_  
\_\_\_\_\_

Estimated Installation Date (if known): \_\_\_\_\_  
\_\_\_\_\_

Insurance Carrier (if required): \_\_\_\_\_  
\_\_\_\_\_

Applicant: \_\_\_\_\_ Date: \_\_\_\_\_

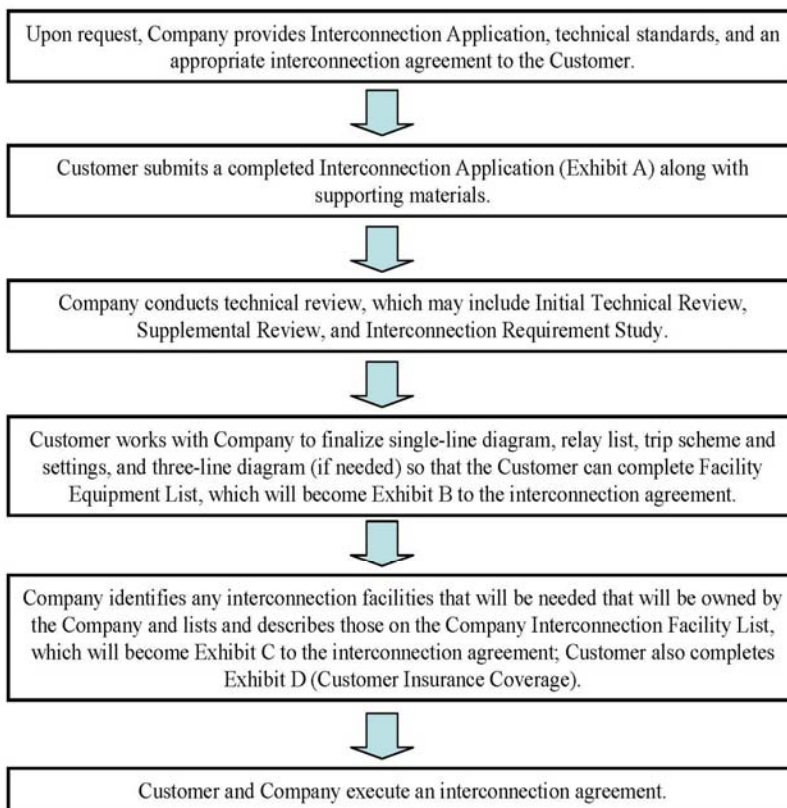
### **APPENDIX III Interconnection Process Overview**

The purpose of this Appendix III is to provide a general overview of the process and procedures for interconnecting a Generating Facility that will operate in parallel with the Company's Distribution System. The general technical guidelines to facilitate the interconnection and parallel operation of Generating Facilities with the Company's Distribution System are set forth in Appendix I of this Rule 14H. For Generating Facilities subject to Rule 14H, if there is a conflict between the technical specifications set forth in Appendix I with any technical specifications set forth elsewhere in the Company's tariffs, the specifications of Appendix I shall prevail. Capitalized terms used in this Appendix III are defined in Appendix I of this Rule 14H.

#### **1. Steps in the Interconnection Process**

- a. The interconnection process will be initiated when a Customer approaches or contacts the Company to request interconnection of a Generating Facility to the Company's Distribution System that will operate in parallel with the Company's Distribution System. The Company shall designate a centralized point of contact for applications to interconnect a Generating Facility to the Company's Distribution System.
- b. The following flowchart provides, for illustrative purposes, the major steps in the interconnection process:

### STEPS IN THE INTERCONNECTION PROCESS



c. The activities in each step shown in the flowchart are explained below:

**Step 1:** Within five (5) business days of receiving a Customer's request to interconnect a Generating Facility to the Company's Distribution System, the Company will provide the Customer with: (a) the Distributed Generating Facility Interconnection Standards Technical Requirements (Rule 14H Appendix I); (b) an appropriate interconnection agreement depending on the Customer's intent to export or participate in a wholesale power sale arrangement; and (c) this Interconnection Process Overview (Rule 14H Appendix III).

**Step 2:** The Company's interconnection review begins when a Customer submits a completed Exhibit A to Appendix II, Appendix II-A or Appendix II-B attached hereto or other

Company-approved application for interconnection of a Generating Facility governed by Rule 14H (“Interconnection Application”).

For those Customers that apply to add a non-exporting system to their existing exporting system, such Customers shall provide the following to the Company, to the extent required to complete the Interconnection Application or otherwise requested by the Company in connection with its interconnection review: the Program System Size and Technical System Size of the existing (exporting) Generating Facility and the new Generating Facility (non-export) addition.

Along with the Customer's Interconnection Application, the Customer must also provide the design drawings, operating manuals, manufacturer's brochures/instruction manual and technical specifications, manufacturer's test reports, bill of material, protection and synchronizing relays and settings, and protection, synchronizing, and control schemes for the Generating Facility to the Company for its review. The Company shall have the right to specify the protection and synchronizing relays and settings, and protection, synchronizing and control schemes, consistent with the technical requirements of Appendix I, that affect the reliability and safety of operation and power quality of the Company's system with which the Generating Facility seeks to interconnect ("Facility Protection Devices/Schemes"). The Company shall maintain the confidentiality of information the Customer deems confidential, unless and until a final, non-appealable Commission decision determines that disclosure is necessary to protect the public or as otherwise determined by the Commission.

Within fifteen (15) business days of the receipt of an Interconnection Application and supporting material, or such other period as is mutually agreed upon in writing by the Company and the Customer, the Company shall review the Customer's Interconnection Application and supporting material and provide written notification of its general completeness, or alternatively, incompleteness. If an Interconnection Application is deemed incomplete, the Company shall specify in a written notice the additional information that is required. The completeness determination cycle will be repeated as necessary until sufficient information is submitted by the Customer to enable the Company to review the Interconnection Application.

**Step 3:** Within fifteen (15) business days of the date the Customer's Interconnection Application and supporting materials are deemed complete, the Company will complete an Initial Technical Review of the Interconnection Application. The Company shall make a determination as to whether a Generating Facility is interconnected, designed to operate in parallel or designed to function with momentary parallel operation with the Company's electric system during the Initial Technical Review.<sup>1</sup> The Initial Technical Review will result in the Company providing either:

**(1) Expedited Review for Self-Supply and NEM+ Systems:**

Interconnection Applications for Customer Self-Supply Systems under Company's Rule 22 (Customer Self-Supply) and NEM+ Systems comprised of more than a standalone energy storage system, e.g. battery storage, under Company's Rule 27 (NEM+) that will not export power across the Point of Interconnection except as allowed under Rule 22, Rule 27 and as required under this Rule 14H, shall qualify for expedited interconnection,

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<sup>1</sup> **Momentary-Parallel Systems:** For Appendix II-B Applications, i.e. Application For Non-Export Distributed Generation Facilities (Momentary-Parallel Operation), if the Generating Facility is designed to operate in parallel with the Distribution System, for a duration of less than 0.1 seconds, i.e. "momentary parallel operation", then the Generating Facility qualifies for expedited interconnection. Registration shall satisfy the Customer's notice requirements set forth in Tariff Rule 3B (Change In Customer's Equipment Or Operations) and is required for purposes of determining potential load that the Company may be required to serve. Such systems shall be deemed to be "non-exporting" and shall not require reverse power protection. However, the Company may install at Company's expense, a bi-directional advanced meter. Company shall have the right to disconnect a Generating Facility without prior notice to the Customer pursuant to Rule 14H, Section 4.b, in the event the Company determines that the Generating Facility is operating in parallel with the Distribution System in excess of momentary parallel operation and Customer shall pay for any and all costs incurred by the Company in enforcing this right.

**(2) Simplified Interconnection or Supplemental Review:** For all Interconnection Applications, other than Appendix II-B, if all of the Initial Technical Review Screens are passed, the Generating Facility qualifies for Simplified Interconnection, and an executable interconnection agreement for the Customer's signature; or, if one or more screens

are not passed, notification that Supplemental Review will be required and the results, in writing, of all Initial Technical Review screenings.

If Supplemental Review is required, the Customer shall notify the Company, in writing, to proceed with the Supplemental Review, or the Customer shall agree to withdraw its Interconnection Application. In order to expedite the process, Customer may pre-acknowledge and agree to proceed to Supplemental Review, if necessary, at the time an Interconnection Application is submitted to the Company for review. Within twenty (20) business days of notification by the Customer that it would like to move forward with Supplemental Review, the Company shall complete a Supplemental Review. The Supplemental Review will result in the Company providing either: (a) Simplified Interconnection (b) interconnection requirements beyond those for a Simplified Interconnection, and a non-binding, good faith estimate of the Company's portion of the costs to perform the interconnection requirements identified by the Supplemental Review, or (c) a determination that an Interconnection Requirements Study (IRS) is required, and a good faith cost estimate and schedule for the completion of the IRS including an identification of the specific analysis and/or reviews that will be performed as part of the IRS.

If an IRS is required, the Customer shall agree to pay the cost estimate for the IRS provided by the Company, or the Customer shall withdraw its Interconnection Application. The Company shall complete the IRS within one hundred fifty (150) calendar days of the Customer's agreement to move forward with the IRS and payment of the IRS cost is received. The completion of the IRS shall include the Company's proposal to the Customer of the following: (a) interconnection requirements and a non-binding, good faith estimate of the Company's portion of the costs to perform the interconnection requirements; and (b) protection and



synchronizing relays and settings, protection, synchronizing and control schemes, and any other equipment and/or performance requirements necessary to meet the IRS requirements.

Final results of all technical screenings, Supplemental Review, and IRS will be provided in writing to the Customer.

**Step 4:** Based on the results of the Initial Technical Review, or Supplemental Review (if needed), or IRS (if needed), the Customer and Company will work together to finalize the single-line diagram, relay list, trip scheme and settings, and three-line diagram, which is required in the circumstances set forth in the Interconnection Application. After finalization of the single-line diagram, relay list, trip scheme and settings, and three-line diagram (if required), the Customer will make any revisions deemed necessary to the Interconnection Application and resubmit the Interconnection Application to the Company. Resubmission will not impact the Customer's interconnection position. The Customer must also complete a Facility Equipment List, which will identify equipment, space and/or data at the Generating Facility location that must be provided by the Customer for use in conjunction with the Company's Interconnection Facilities. The Facility Equipment List will be included as Exhibit B to an interconnection agreement entered between the Company and the Customer. If requested, the Company will provide assistance to the Customer to complete the Facility Equipment List.

**Step 5:** Within fifteen (15) business days of the completion of all activities specified in Step 4 above, or within such other period as is mutually agreed upon in writing by the Company and the Customer, the Company will complete an identification of Interconnection Facilities that are necessary to complete the interconnection and that will be owned by the Company. A list and description of the Company's Interconnection Facilities will be included as Exhibit C to the interconnection agreement entered between the Company and the Customer. The Company and

Customer shall mutually agree in writing to a schedule by which the Interconnection Facilities will be constructed and a determination of when the Customer's Generating Facility shall be connected to the Company's Distribution System. The Interconnection Facilities are project-specific, and the time to complete the facilities will depend on the complexity of the facilities required. Consistent with Section 5 of this Appendix III, the Customer shall maintain insurance coverage or be self-insured against risks arising under the interconnection agreement. The Customer Insurance Coverage will be included as Exhibit D to any interconnection agreement entered between the Company and the Customer.

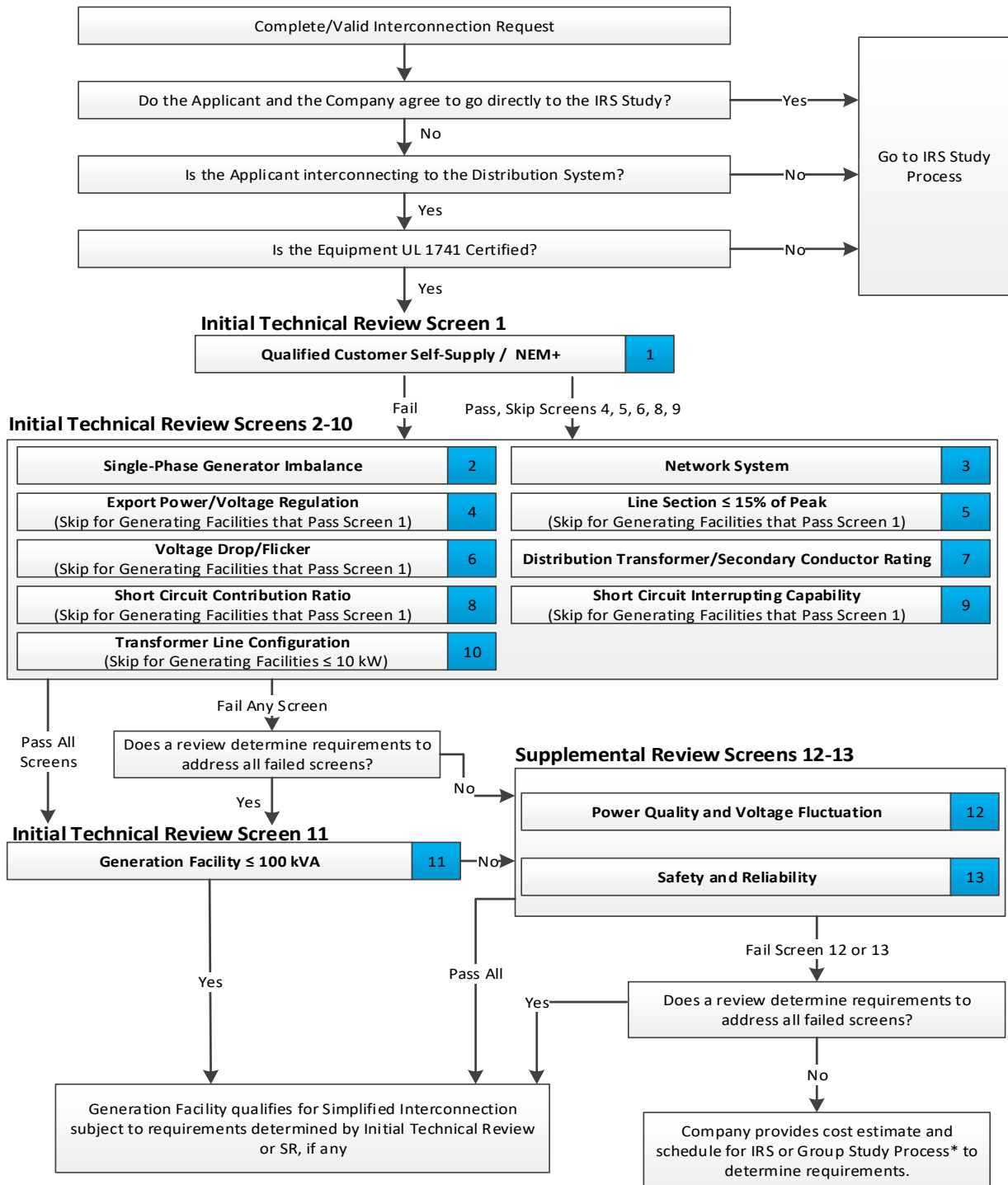
**Step 6:** Within five (5) business days of the completion of all activities specified in Step 5 above, the Company will provide the Customer with an executable interconnection agreement, which must be executed prior to the interconnection and parallel operation of the Customer's Generating Facility. If requested by the Customer, the interconnection agreement may be signed by the Customer and a third party that is the owner and/or operator of the Generating Facility.

The Company will provide a fully executed interconnection agreement to the Customer:  
(a) within fifteen (15) business days of receipt of Customer's executed interconnection agreement if all applicable City and/or County permits required for the Generating Facility have been closed and posted, and all Customer documentation required as a part of the interconnection agreement have been received; or (b) within fifteen (15) business days following the date upon which all applicable City and/or County permits required for the Generating Facility have been closed and posted, and all Customer documentation required as a part of the interconnection agreement have been received.

**2. Overview of Technical Review Process**

a. **Process Flowchart:** The following flowchart provides, for illustrative purposes, the major steps in the technical review process:

### TECHNICAL REVIEW PROCESS FLOW CHART



\* "Group Study Process" may include a consolidated IRS or a proactive utility determination of interconnection requirements covering multiple Generating Facilities.

b. **Explanation of Screens:** The following provides an explanation of the screens used in the technical review process:

**Introduction:**

The technical review process allows for the timely approval for the interconnection of Generating Facilities to the Company's Distribution System that will operate in parallel with the Company's Distribution System. The technical review process includes a screening to determine if a Generating Facility qualifies for Simplified Interconnection, or if Supplemental Review is needed to determine requirements, if any, beyond those of a Simplified Interconnection, or if an Interconnection Requirement Study (IRS) is needed to determine interconnection requirements. The Company will perform an Initial Technical Review unless (1) Applicant and the Company mutually agree to proceed directly to an IRS, (2) an Applicant is not connecting to the Company's Distribution System, or (3) an Applicant is interconnecting with equipment that is not UL 1741 certified, provided that the Company may permit uncertified equipment to proceed without an IRS if the equipment will provide benefits related to safety, reliability or power quality. If (1), (2), or (3) applies, the Applicant will proceed directly to an IRS.

**Note:** Failure to pass any screen of the Initial Technical Review process or Supplemental Review process means only that additional review is required to determine whether additional requirements, if any, are needed before the Generating Facility can be approved for interconnection with the Company's Distribution System. Although not explicitly covered in the review process, the Generation Facility shall be designed to meet all of the applicable requirements in Appendix I of Rule 14H.

**Purpose:**

The technical review process determines the following:

- 1) If a Generating Facility qualifies for Simplified Interconnection,
- 2) If a Generating Facility can be made to qualify for interconnection by performing a Supplemental Review that will be able to determine additional requirements, if any,
- 3) If an IRS is required, the cost estimates and rough schedule for performing the IRS, or

**Initial Technical Review Screens (Screens 1 through 11):**

**Screen 1:** Does the proposed Generating Facility meet the Technical Specifications stated in Rule 22 (Customer Self Supply), Appendix II, or Rule 27 (NEM+), Appendix III?

*If Yes, (Pass),* continue to Screen 2, skip Screens 4, 5, 6, 8, and 9.

*If No (Fail),* continue to Screen 2.

**Significance:** 1) The Screen affords Expedited Review for qualified Customer Self-Supply Systems and NEM+ Systems.

**Note 1:** For a qualified Customer Self-Supply System or NEM+ System, the Company may install, at Company's expense, a bi-directional advanced meter.

**Note 2:** Any equipment for a qualified Customer Self-Supply System or NEM+ System shall be included by the Customer in the Facility Equipment List. Such equipment is intended to monitor and prevent an extended reverse power condition in which power flows from the Generating Facility to the Distribution System.

Note 3: The Company shall have the right to disconnect a Generating Facility without prior notice to the Customer pursuant to Rule 14H, Appendix I, Section 4.b in the event the Company determines that the Generating Facility is exporting power to the Distribution System for longer than the allowable limit as defined in Rule 22, Appendix II, or in a manner inconsistent with the limits defined in Rule 27, Appendix III, as applicable and Customer shall pay for any and all costs incurred by the Company in enforcing this right.

**Screen 2:** If the proposed Generating Facility is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, does it cause unacceptable imbalance between the two phases of the 240 volt service?

*If Yes, (Fail),* continue to Screen 3; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failure(s). Otherwise, Supplemental Review is required.

*If No, (Pass),* continue to Screen 3.

Significance: Generating Facilities connected to a single-phase transformer with 120/240 V secondary voltage must be installed such that the aggregated gross output is as balanced as practicable between the two phases of the 240 volt service.

**Screen 3:** Is the Point of Interconnection to a Network System?

*If Yes (Fail),* continue to Screen 4; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical

Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

*If No (Pass)*, continue to Screen 4.

Significance: Special considerations must be given to Generating Facilities proposed to be installed on a Network System because of the design and operational aspects of network protectors. There are no such considerations for radial Distribution Systems.

**Screen 4:** If exporting power across the Point of Interconnection, can the power export cause a reversal of power flow, during normally expected circuit operating conditions, at any voltage regulation device that is not bi-directional?

*If Yes (Fail)*, continue to Screen 5; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

*If No (Pass)*, continue to Screen 5.

Significance: If it can be assured that the Generating Facility will not export power, or if exported power will not cause a reversal of power flow at a voltage regulation device that is not designed to handle reverse power flow, the Company's Distribution System does not need to be studied for load-carrying capability or Generating Facility power flow effects on the Company's voltage regulators.

Note 1: This screen does not apply to a Generating Facility that passes Screen 1.



Note 2: The Technical System Size will be used in the evaluation of this Screen.

However, if for example, the contribution of the energy storage system to the Technical System Size is limited by programming or by some other on-site limiting element, the reduced Technical System Size will be used in the evaluation of this Screen.

**Screen 5:** Is the aggregate Generating Facility capacity on the Line Section less than or equal to 15% of Line Section peak?

*If Yes (Pass),* continue to Screen 6.

*If No (Fail),* continue to Screen 6; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

Significance: 1) Low penetration of Generating Facility installations should have a minimal impact on the operation and load restoration efforts of the Company's Distribution System.

2) The operating requirements for a high penetration of Generating Facilities may be different since the impact on the Company's Distribution System will no longer be minimal, therefore requiring additional study or controls.

Note 1: This screen does not apply to a Generating Facility that passes Screen 1.

Note 2: The Technical System Size will be used in the evaluation of this Screen.

However, if for example, the contribution of the energy storage system to the Technical System Size is limited by programming or by some other on-site limiting element, the reduced Technical System Size will be used in the evaluation of this Screen.

**Screen 6:** Is the voltage flicker and/or voltage drops associated with the Generating Facility within IEEE 519, IEEE 1453, or General Order 7 limits?

*If Yes (Pass),* continue to Screen 7.

*If No (Fail),* continue to Screen 7; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

Significance:

- 1) This screen addresses potential voltage fluctuation problems for other customers on the distribution circuit caused by Generating Facilities, especially those that start by motoring.
- 2) When starting or connecting to the system, Generating Facilities should have minimal impact on the service voltage of other Customers.
- 3) This screen addresses voltage flicker at the Point of Interconnection caused by the Generating Facility. Passing this screen does not relieve the Customer from ensuring that its Generating Facility complies with the flicker requirements of Rule 14H.

Note 1: This screen does not apply to a Generating Facility that passes Screen 1.

Note 2: The Technical System Size will be used in the evaluation of this Screen.

However, if for example, the contribution of the energy storage system to the Technical System Size is limited by programming or by some other on-site limiting element, the reduced Technical System Size will be used in the evaluation of this Screen.

Note 3: Energy Storage Systems that are designed or operated to charge from the utility grid will be considered in this Screen. The maximum charging kW of the energy storage system will be used in the evaluation of this Screen.

**Screen 7**: Do the maximum aggregated gross ratings for all the Generating Facilities connected to a secondary distribution transformer exceed the transformer, secondary conductor, fuse, or other equipment rating, absent the Applicant's generators?

*If Yes (Fail)*, continue to Screen 8; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

*If No (Pass)*, continue to Screen 8.

Significance: This screen addresses potential Distribution Transformer or secondary conductor, fuse, and/or other equipment overloads and steady state over voltage issues.

Note 1: For a Generating Facility that passes Screen 1, the Generating Facility will be considered to have a net-zero load impact to the calculations performed as part of this screen (i.e. customer load will be offset by the qualified Customer Self-Supply System or NEM+ system).

Note 2: As applicable, the Technical System Size will be used in the evaluation of this Screen. However, if for example, the contribution of the energy storage system to the Technical System Size is limited by programming or by some other on-site limiting element, the reduced Technical System Size will be used in the evaluation of this Screen

Note 3: Energy Storage Systems that are designed or operated to charge from the utility grid will be considered in this Screen. The maximum charging kW of the energy storage system will be used in the evaluation of this Screen.

**Screen 8:** Is the Short Circuit Current Contribution Ratio within acceptable limits?

*If Yes (Pass),* continue to Screen 9.

*If No (Fail),* continue to Screen 9; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

Significance: When measured at the primary side (high side) of a Dedicated Distribution Transformer serving a Generating Facility, the sum of the short circuit contribution ratios of all generating facilities connected to the secondary side (low side) of that Distribution Transformer must be less than or equal to 0.1 (10%). If the Generating Facility passes this screen it can be expected that it will have no significant impact on the Company's Distribution System's short circuit duty, fault detection sensitivity, relay coordination or fuse-saving schemes.

Note 1: This screen does not apply to a Generating Facility that passes Screen 1.

**Screen 9:** Is the Short Circuit interrupting capability exceeded?

*If Yes (Fail)*, continue to Screen 10; Initial Technical Review Screens 2 through 10 shall be completed in their entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

*If No (Pass)*, continue to Screen 10.

Significance: This Screen determines whether the Generating Facility, in aggregate with other generation on the distribution circuit, causes any distribution protective devices and equipment on the system to exceed 87.5% of their short circuit interrupting capability. If the Generating Facility passes this screen it can be expected that it will have no significant impact on the Customer's service equipment.

Note 1: This screen does not apply to a Generating Facility that passes Screen 1.

**Screen 10:** Is the Line Configuration Screen (see below) acceptable for Simplified Interconnection?

*If Yes (Pass)*, continue to Screen 11.

*If No (Fail)*, continue to Screen 11; Initial Technical Review Screens 2 through 10 shall be completed in its entirety. If any of the Screens 2 through 10 are not passed, Company may perform a review of the failed Screen(s) during the Initial Technical Review period which may determine additional requirements needed to address the failed Screen(s). Otherwise, Supplemental Review is required.

Line Configuration Screen: Identify primary distribution line configuration that will serve the Generating Facility. Based on the type of interconnection to be used for the Generating Facility, determine from the table below if the proposed Generating Facility passes the screen.

Table I

Primary Distribution Line Type Configuration	Type of Interconnection to be Made to Primary Distribution Line	Results/Criteria
Three-phase, three wire	Any type	Pass Screen
Three-phase, four wire	Single-phase, line-to-neutral	Pass Screen
Three-phase, four wire (For any line that has such a section OR mixed three wire and four wire)	All others	To pass, aggregate Generating Facility nameplate rating must be less than or equal to 10% of Line Section peak load

Significance: If the primary distribution line serving the Generating Facility is of a “three-wire” configuration, or if the Generating Facility’s distribution transformer is single-phase and connected in a line-to-neutral configuration, then there is no concern about overvoltages to the Company’s or other Customer’s equipment caused by loss of system neutral grounding during the operating time of the non-islanding protective function.

Note 1: This Screen does not apply to Generating Facilities with a Gross Rating of 10 kW or less.

**Screen 11:** Is the gross rating of the Generating Facility 100 kVA or less?

*If Yes*, the Generating Facility qualifies for Simplified Interconnection. Skip remaining screens.

*If No*, continue to Screen 12.

Significance: After meeting the requirements of the previous screens, this Generating Facility will likely have a reduced impact on the Company's Distribution System.

c. Within fifteen (15) business days of the date the Customer's Interconnection Application is deemed complete, the Company will complete the Initial Technical Review and notify the Customer of the results.

d. In the event that Supplemental Review would otherwise be triggered by a failure of Screens 1 through 11, Company may perform a review of the failed screen(s) during the Initial Technical Review period which may determine the additional requirements needed to address the failed screen(s) without the need for Supplemental Review. Otherwise, Supplemental Review is required. Some examples of requirements that may be available to address the failure of Screens 1 through 11 without the need for Supplemental Review include:

1. Replace an overloaded Distribution Transformer with a larger transformer.
2. Replace overloaded secondary conductors with larger conductor.
3. Installation of an appropriately sized grounding transformer or other means to effectively ground a generator.
4. Transformer load tap changer upgrades.
5. Modified voltage and frequency ride-through settings.
6. Active and reactive power requirements.

7. Determine if phase balancing on the transformer is possible with minimal review.
8. If possible without further study, check if the Generating Facility will actually overstress equipment.
  - e. If Company performs a review of failed Screen(s) 1 through 11 during the Initial Technical Review period and is able to determine the additional requirements needed to address the failed screen(s) and such additional requirements includes equipment, space and/or data at the Generating Facility location to be provided by the Customer for use in conjunction with the Company's Interconnection Facilities, then the Customer must also complete a Facility Equipment List, which will identify such equipment, space and/or data. The Facility Equipment List will be included as Exhibit B to any interconnection agreement entered between the Company and the Customer. If requested, the Company will provide assistance to the Customer to complete the Facility Equipment List. Company will provide a non-binding, good faith estimate of the Company's portion of the costs to perform the interconnection requirement that has been identified.
  - f. The Initial Technical Review will result in the Company providing either: (a) if all of the Initial Technical Review Screens are passed, the Generating Facility qualifies for Simplified Interconnection, and an executable interconnection agreement for the Customer's signature; or, (b) if one or more screens are not passed, notification whether Supplemental Review will be required and the results, in writing, of all Initial Technical Review screenings.

### **3. Supplemental Review**

- a. If a Generating Facility has failed to meet one or more of the Initial Technical Review screens for Simplified Interconnection as proposed, and a review of the failed screen(s)



cannot determine the requirement(s) to address the failure(s), then the Company will notify the Customer upon completing Initial Technical Review that a Supplemental Review as described in this section is needed.

b. If Supplemental Review is required, the Customer shall notify the Company, in writing, to proceed with the Supplemental Review, or the Customer shall agree to withdraw the Interconnection Application. If the Customer does not notify the Company within fifteen (15) business days, the Interconnection Application shall be deemed to be withdrawn.

c. The Supplemental Review shall be completed, absent any extraordinary circumstances, within twenty (20) business days of receipt of the Customer's approval, in writing, to proceed with the Supplemental Review. The Company, for good cause, without extraordinary circumstances, may modify the time limits to conduct the Supplemental Review and shall inform the Customer in writing of the need to modify the applicable time limits. The modified time limit shall be mutually agreed upon in writing between the Company and the Customer.

d. The Supplemental Review will result in the Company providing either: (a) Simplified Interconnection, (b) interconnection requirements beyond those for a Simplified Interconnection, and a non-binding, good faith estimate of the Company's portion of the costs to perform the interconnection requirements identified by the Supplemental Review, or (c) a determination that an IRS is required and a good faith cost estimate and schedule for the completion of the IRS, including an identification of the specific analysis and/or reviews that will be performed as part of the IRS.

e. The Supplemental Review consists of Screens 12 and 13. If any of the Screens are not passed, a review of the failed Screen(s) within the timeframe established for

Supplemental Review, or any modified time limits, may determine interconnection requirements or special design or operating requirements of the Generating Facility to address the failure(s), in which case an IRS may not be necessary. Otherwise, an IRS is required. Some examples of requirements that may be available to address the failure of Screens 12 and 13 without the need for an IRS include:

1. Replacing a fixed capacitor bank with a switched capacitor bank.
2. Adjustment of line regulation settings.
3. Reconfiguration of the distribution circuit.
4. A modified operating schedule of the Generating Facility.
5. Additional technical requirements of the Generating Facility equipment.

**Supplemental Review Screens (Screens 12 – 13):**

**Screen 12 (Power Quality and Voltage Tests):** In aggregate with existing generation on the Line Section,

- a) Can it be determined within the Supplemental Review that the voltage can be maintained in compliance with General Order 7?
- b) Can it be determined within the Supplemental Review that the voltage fluctuation is within acceptable limits as defined by IEEE 1453 or utility practice similar to IEEE 1453?
- c) Can it be determined within the Supplemental Review that the harmonic levels meet IEEE 519 limits at the point of interconnection?

*If Yes to all (Pass), continue to Screen 13.*

*If No (Fail), a review of the failure may determine the additional requirements needed to address the failure; Continue to Screen 13.*

Significance: Adverse voltages and undesirable interference may be experienced by other customers on the Company's Distribution System caused by operation of the Generating Facility.

**Screen 13 (Safety and Reliability Tests)**: Does the location of the proposed Generating Facility or the aggregate generation capacity on the Line Section create impacts to safety or reliability that cannot be adequately addressed without an IRS?

*If Yes (Pass)*, a review of the failure during the Supplemental Review may determine the requirements to address the failure, e.g. a Customer Self-Supply System that complies with the Technical Specifications stated in Company Rule 22 (Customer Self-Supply); otherwise, an IRS is required.

*If No (Fail)*, Supplemental Review is complete.

Significance: In the safety and reliability test, there are several factors that may affect the nature and performance of an interconnection. These include, but are not limited to:

1. Generation energy source
2. Modes of synchronization
3. Unique system topology
4. Possible impacts to critical load customers
5. Possible safety impacts

The specific combination of these factors will determine if any system study requirements are needed. The following are some examples of the items that may be considered under this screen:

1. Does the Line Section have significant minimum loading levels dominated by a small number of customers (*i.e.*, several large commercial customers)?
2. Is there an even or uneven distribution of loading along the feeder?
3. Is the proposed Generating Facility located in close proximity to the substation (*i.e.* <2.5 electrical line miles), and is the distribution line from the substation to the customer composed of large conductor/cable (*i.e.*, 600A class cable)?
4. Does the Generating Facility incorporate a time delay function to prevent reconnection of the generator to the system until system voltage and frequency are within normal limits for a prescribed time?
5. Is operational flexibility reduced by the proposed Generating Facility, such that transfer of the Line Section(s) of the Generating Facility to a neighboring distribution circuit/substation may trigger overloads or voltage issues?
6. Does the Generating Facility utilize certified anti-islanding functions and equipment?

f. The Supplemental Review shall be completed within twenty (20) business days of completion of Initial Technical Review.

e. If the Supplemental Review results in interconnection requirements beyond those for a Simplified Interconnection, the Customer must also complete a Facility Equipment List, which will identify equipment, space and/or data at the Generating Facility location to be

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provided by the Customer for use in conjunction with the Company's Interconnection Facilities.

The Facility Equipment List will be included as an Exhibit to any interconnection agreement entered between the Company and the Customer. If requested, the Company will provide assistance to the Customer to complete the Facility Equipment List.

**4. Interconnection Requirements Study ("IRS")**

If the Supplemental Review process fails to determine interconnection requirements, then an IRS shall be performed as follows:

a. If an IRS is necessary, the Company will provide the Customer with a good faith cost estimate and schedule for the completion of the IRS including an identification of the specific analysis and/or reviews that will be performed as part of the IRS. A cost estimate and schedule for the analyses will be provided to the Customer before the overall study is started.

This generally would be done when the Company responds to the Customer with the findings of the Supplemental Review.

b. If an IRS is required, the Customer shall agree to pay the cost estimate for the IRS provided by the Company, or the Customer shall withdraw its Interconnection Application. If the Customer does not agree to perform an IRS or agree to pay the cost estimate for the IRS within

fifteen (15) business days, the Interconnection Application shall be deemed to be withdrawn.

Customers with existing Generating Facilities already operating in parallel with the Company's system on March 21, 2003, will not be charged for any IRS.

c. The scope and cost of the IRS will depend on the complexity of the Company's Distribution System to which the Generating Facility is requesting to interconnect, which must be modeled, and the degree to which the Generating Facility will affect the Company's system. Examples of the analyses and/or reviews that fall within an IRS include: (1) Feeder Load Flow; (2) Dynamic Stability Analysis; (3) Transient Overvoltage; and (4) Short Circuit and Relay Coordination.

d. The Company may perform the analyses included in the IRS. The Company may also contract the analyses or parts of the analyses to an outside consultant specializing in such analyses for complex situations, or in situations where the Company does not have available resources to conduct the analyses in a time frame mutually agreeable to both the Company and the Customer.

e. The Company shall complete or have a consultant complete the IRS within one hundred fifty (150) calendar days of the Customer's payment of the IRS. The Company, for good cause, without extraordinary circumstances, may modify the time limits to conduct the IRS and shall inform the Customer in writing of the need to modify the applicable time limit. The modified time limit shall be mutually agreed upon in writing between the Company and the Customer. The Company, shall provide a written letter to the Customer to explain all delays in completing the IRS beyond the completion schedule of one hundred fifty (150) calendar days.

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- f. The Customer and Company may agree (to be documented in writing) to have the IRS performed by a qualified third-party consultant, or by a qualified employee, contractor, or agent of the Customer at the Customer's sole cost so long as the employee, consultant, contractor, or agent meets the following qualifications: (1) experience and familiarity with electric utility system modeling, feeder load flow analyses, dynamic stability analyses, transient overvoltage analyses, and short circuit and relay coordination; (2) knowledge of electric utility system operation, transmission and distribution system planning and protection, and distributed generation interconnection issues; and (3) knowledge of the unique characteristics and needs of small, non-interconnected island electric grids and the unique challenges and operational requirements of such systems. In addition, the scope of work of the third-party consultant's study shall be mutually agreeable to both the Company and the Customer. Elements of the study scope of work may include items such as: (1) Feeder Load Flow; (2) Dynamic Stability Analysis; (3) Transient Overvoltage; and (4) Short Circuit and Relay Coordination. All study recommendations by the Customer's consultant shall be reviewed and approved by the Company.
- g. The Company may consolidate more than one Generating Facility in an IRS if the Generating Facilities are on the same Distribution System feeder that is the subject of the IRS, provided that the Customers consent to consolidation and the sharing of technical information between them. Parties to a consolidated IRS shall pay study and upgrade costs on a pro rata basis as agreed by the parties that desire to share the costs for the IRS. The cost may be prorated based upon the expected annual electricity output of the respective facilities or the capacity of the Generating Facility.

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h. The IRS may identify the need for Company Interconnection Facilities required to facilitate interconnection of the Generating Facility. The Customer will be responsible for the cost of any Company Interconnection Facilities associated with the interconnection of its



Generating Facility. An identification of the Company Interconnection Facilities and an estimated cost of the Company Interconnection Facilities shall be listed in Exhibit C (Interconnection Facilities Owned by the Company) to the interconnection agreement entered between the Company and the Customer. The Customer will be responsible for the cost of any Company Interconnection Facilities associated with the interconnection of its Generating Facility.

i. If the Company determines that there are benefits to the utility system due to the Company Interconnection Facilities, a credit reflecting these benefits shall be provided to the Customer, subject to Commission approval. For example, if there is a planned Distribution System addition that may be deferred or displaced due to the addition of the Company Interconnection Facilities associated with interconnection of a Generating Facility, the dollar value of the deferral or displacement would be determined and proposed to be credited to the Customer (subject to Hawaii Public Utility Commission's approval) as a line item in Exhibit C to the interconnection agreement (Interconnection Facilities Owned by the Company), Section 2 (Customer Payment to Company for Company Interconnection Facilities, Review of Facility, and Review of Verification Testing). The calculation of the benefits to the utility system will be examined on a case-by-case basis taking into account what Distribution System addition(s) would have been deferred or displaced by the Company Interconnection Facilities that resulted from the interconnection of a Generation Facility. The Company would then calculate a dollar value of the deferral or displacement, and propose to credit the Customer for that deferral or displacement value. The Company shall file a letter providing the Commission with sufficient information to document the proposed credit to be provided to the Customer for said deferral or

j. displacement value. The proposed deferral or displacement value would not be credited to the Customer until the Commission approves such credit.

**5. Insurance Coverage**

a. In accordance with Commission Decision and Order No. 22248, Docket No. 03-0371, the Company will not impose a standardized insurance requirement for distributed generation projects. However, the Customer is obligated to carry adequate insurance in forms and amounts that are commercially reasonable for each particular situation. The Customer bears responsibility for determining its insurance requirements. Prior to execution of the standard interconnection agreement, the Customer shall disclose if it will be self-insured (and if so its means and capability to self-insure) or if it will obtain an insurance policy (and if so in what forms and amounts). The Customer shall provide evidence of such insurance, including insurer's acknowledgement that coverage applies with respect to the standard interconnection agreement, by providing certificates of insurance to the Company prior to any parallel interconnection, or, if insurance is being modified, within 30 days of any change.

b. As general guidance, the Company recommends consideration of a commercial general liability policy, covering bodily injury and property damage. The Company also recommends that coverage amounts be considered relative to the nameplate rating of the generator, with higher amounts of coverage for larger generators. Additionally, the Company recommends consideration of the following insurance provisions: (1) naming the Company, its directors, officers, agents, and employees as additional insureds; (2) inclusion of contractual liability coverage for written contracts and agreements including the standard interconnection agreement; (3) inclusion of provisions stating that the insurance will respond to claims or suits by additional insureds against the Customer or any other insured thereunder; and (4) inclusion of

provisions that the insurance is primary with respect to the Customer and the Company. The adequacy of the coverage afforded by the insurance should be reviewed by the Customer from time to time, and if it appears in such review that risk exposures require an increase in the coverages and/or limits of this insurance, the Customer should make such increase to that extent.

**6. Resolution of Disputes**

a. If there is a dispute between the Customer and the Company as to whether an IRS is required, or as to the scope and cost of the study, then the Company generally would use the following procedures: (1) the Company's Contact Person would inform the Customer of the reasons for and scope of the study required; (2) if the Customer disagrees with the conclusion, then the Customer would meet with representatives from the Company to discuss the matter; (3) if the Customer continues to disagree with the conclusion, then the Customer would write to the Company's Contact Person explaining the position of the Customer, and the Company's Contact Person would respond in writing within fifteen (15) business days<sup>2</sup> (so that any dispute is reduced to writing); (4) if the parties continue to have a dispute, then authorized representatives from the Company and Customer (having full authority to settle the dispute) would meet in Hawaii (or by telephone conference) with the meeting to be scheduled within fifteen (15) business days of a written request and attempt in good faith to resolve the dispute; and (5) if the parties continue to have a dispute, then the parties may engage in a form of alternative dispute resolution agreeable to both parties, or a party may request that the Commission resolve the matter by filing a written request with the Commission attaching the relevant information and

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<sup>2</sup> The Company, for good cause, may modify the time limit. If the Company modifies the time limit, it shall notify the Customer in writing of the modification and the cause for the modification.

correspondence, and serving the request on the other party and the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs of the State of Hawaii.

b. If there is a dispute as to the need for interconnection equipment, protective devices or control systems, then the Company generally would use the following procedures: (1) the Company's Contact Person would inform the Customer of the reasons for the interconnection equipment/protective devices/control systems; (2) if the Customer disagrees with the conclusion, then the Customer would meet with representatives from the Company to discuss the matter; (3) additional analyses may be conducted by the Company at the request of a Customer that questions the need for particular interconnection equipment/protective devices/control systems if the Customer pays for the analyses; (4) if the Customer continues to disagree with the conclusion, then the Customer would write to the Company's Contact Person explaining the position of the Customer, and the Company's Contact Person would respond in writing within fifteen (15) business days<sup>3</sup> (so that any dispute is reduced to writing); (5) if the parties continue to have a dispute, then authorized representatives from the Company and Customer (having full authority to settle the dispute), would meet in Hawaii (or by telephone conference) with the meeting to be scheduled within fifteen (15) business days of a written request and attempt in good faith to resolve the dispute; and (6) if the parties continue to have a dispute, then the parties may engage in a form of alternative dispute resolution agreeable to both parties, or a party may request that the Commission resolve the matter by filing a written request with the Commission attaching the relevant information and correspondence, and serving the request on the other party

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<sup>3</sup> The Company, for good cause, may modify the time limit. If the Company modifies the time limit, it shall notify the Customer in writing of the modification and the cause for the modification.

and the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs of the State of Hawaii.

c. Customers are not required to exhaust the Company's dispute resolution procedures set forth above before proceeding under provisions applicable to informal or formal complaints or other provisions contained under the Rules of Practice and Procedure before the Public Utilities Commission, currently codified in Title 6, Chapter 61, Subchapter 5 of the Hawaii Administrative Rules, or any other applicable statutes, orders, rules, or regulations. If any such proceeding is initiated, the Customer shall notify the Company's Contact Person in writing that it does not desire to continue the Company's dispute resolution procedures.

7. **Modifications to Interconnection Applications**

a. The provisions of this Section 7 shall apply only to those Customer Interconnection Applications for Generating Facilities under a Commission-approved DER program.

b. With respect to each Interconnection Application submitted by the Customer, the Company shall allow the Customer to make modifications to each such Interconnection Application which increase the system capacity of the Customer's installed Generating Facility by up to 1 kW (100 Watts for Hawaii Electric Light) (when compared to the Customer's original Interconnection Application for such Generating Facility), provided that, in each case, the Customer submits a written request to the Company identifying a reasonable basis for such capacity expansion. For purposes of this Section 7.b, "reasonable basis" may include, without limitation: changes to the Company's qualified equipment list, switching contractors, non-availability of original equipment (and/or availability of better equipment), roof alterations or changes in shading, improved analysis of home electricity use and the evolving equipment requirements of third-party system financing or leasing companies.

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c. Any 1 kW increase permitted under this Section 7 shall be measured against the lowest or initial conditional approval system size on record for the Generating Facility, whichever is less.

d. The 1 kW allowance provided pursuant to this Section 7 will not be applied against Commission-approved DER program caps after the applicable DER program capacity limit has been reached. However, the 1 kW allowance provided pursuant to this Section 7 will be applied against Commission-approved DER program caps while the applicable DER program is open and program capacity remains available. For tracking and monitoring purposes, the Company shall maintain a record of all Customers that have, since June 29, 2018, requested, and been approved for, an allowance up to 1 kW under Section 7.b above.

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